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Determinants of Director Compensation in Two-Tier Systems: Evidence from German Panel Data

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Abstract Building on a unique panel data set of German Prime Standard companies for the period 2005-2008, this paper investigates the influencing factors of both director compensation levels and structure, i.e. the probability of performance-based compensation. Drawing on agency theory arguments and previous literature, we analyze a comprehensive group of determinants, including detailed corporate performance, ownership and board characteristics. While controlling for unobserved heterogeneity, we find director compensation to be set in ways consistent with optimal contracting theory. I.e. compensation is systematically structured to mitigate agency conflicts and to encourage effective monitoring. Thus, our results indicate that similar types of agency conflicts exist in the German two-tier setting.

Keywords *Director Compensation, Corporate Governance, Outside
Directors, Two-tier System, Agency Costs*

JEL Classification *J33, G30, G34*

1 Introduction

The objective of corporate governance is to constitute an efficient and functioning structure that overcomes diverging interests generated by the separation of ownership and control in widely-held corporations (Berle and Means 1932; Jensen and Meckling 1976). A common view builds upon the principal-agent relationship between shareholders and managers and describes corporate governance as the set of mechanisms to align the interests of both parties (Shleifer and Vishny 1997). Accordingly, investors interested in inducing managers to act on their behalf have the choice between incentives that mitigate conflicting interests and increasing monitoring of the agents' efforts. In that perspective, non-executive directors represent an important corporate governance mechanism: they perform the critical functions of monitoring and providing strategic advice to the firm's management (Fama 1980; Fama and Jensen 1983).¹

However, directors are *delegated* monitors. Thus their activities may not improve governance but create (additional and simultaneous) agency problems because diverging interests can exist between shareholders and directors as well (Jensen 1993). Again, shareholders face the trade-off between incentives and control. However, since there is only limited room for monitoring directors, incentives gain in importance (e.g. Kumar and Sivaramakrishnan 2008). In fact, empirical evidence from the US suggests that a growing number of companies are adopting compensation structures that aim to align interests of directors and shareholders, for instance by introducing equity-based incentives (e.g. Black and Bhagat 2002; Fich and Shivdasani 2005; Ertugrul and Hegde 2008).

However, US studies only provide evidence for the one-tier setting and so far there has been hardly any systematic empirical analysis of the issue within a two-tier setting. This is surprising, since internal governance within the two-tier framework differs significantly from their one-tier counterparts (e.g. Jungmann 2006). The fundamental difference between the two settings is the fact that control of executives in the two-tier system is delegated to a separate supervisory board, while in the one-tier system it is defined to be an additional task of the board itself. Given these differences there is an ongoing conceptual debate about *optimal* director compensation within the two-tier setting. On the one hand, some commentators argue that the disciplinary power of two-tier boards is greater (Moerland 1995) and that two-tier directors are better stewards of the firm's assets than self-serving agents (Fallgatter 2003). Adopting this view, incentive systems for directors should only play a minor role. On the other hand, scholars argue that information asymmetry in a dual board structure is expected to be larger, making monitoring more difficult (e.g. Conyon and Schwalbach 2000). Accordingly, incentive contracts for directors should be even more relevant.

¹ From now on, we will use the phrase *director* for any non-executive board member and *executive* or *manager* for all executive directors.

In this paper, we adopt an empirical approach and examine the level and structure of director compensation in Germany, which is considered to be the prototype example of a large economy that has established a two-tier system (see e.g. Goergen et al. 2008 for details).² Based on a novel, hand-collected data set covering German Prime Standard firms for the period 2005–2008, our descriptive analysis reveals that the average compensation per director is rather low at some €38,000 and only 61.2% of firms use performance-based compensation elements. Building on agency arguments and evidence from the one-tier setting, we then distinguish four types of determinants of director compensation: firm characteristics, corporate performance, ownership structure and board characteristics. Using panel data methods that allow for unobserved heterogeneity, we find that compensation of directors is structured in a way that provides incentives to monitor executives, in particular in firms with otherwise weak governance mechanisms.

We contribute to the existing literature in several ways. First, we provide descriptive empirical evidence on the level and structure of director compensation within a two-tier system. While there are several countries that have established two-tier systems, there is only scarce empirical evidence on the problem of director compensation in such a setting. Second, we construct an ample panel data set that allows us to examine a comprehensive set of determinants using panel-data methods which control for unobserved firm heterogeneity. Panel data analyses that take into account unobserved heterogeneity represent state-of-the-art methods in empirical corporate governance research (Himmelberg et al. 1999; Börsch-Supan and Köke 2002). However, these methods have only recently been adopted in studies on director compensation and to date there are only limited studies employing these methods

² It is well known that the German corporate governance system is characterized by a two-tier system with two boards: the supervisory board (Aufsichtsrat) and the management board (Vorstand). According to the German Stock Corporation Act (Aktiengesetz – AktG), the supervisory board supervises (§111 AktG) and appoints (§84 AktG) members of the management board. A peculiarity of the German corporate governance system is the Codetermination Act of 1976 (MitbestG). It regulates the possibility of mandatory employee representatives within the supervisory board depending on firm size and the sector the firm is operating in. Thus, for firms operating under codetermination there are two types of supervisory board members: shareholder representatives and employee representatives. As both director types are subject of the same rights and duties, we do not explicitly distinguish between their backgrounds in the remainder of the paper. Nevertheless, the sensitivity to monetary incentives will be generally lower for employee representatives since they are usually obliged to pass a substantial share of their compensation package on to Hans-Böckler-Stiftung, a foundation of the Confederation of German Trade Unions. However, this does not mean that compensation is irrelevant for employee representatives: First, the general provisions with regard to the payout ratio to employee representatives have been gradually revised in the past years (higher thresholds until a mandatory and proportionate transfer payment kicks in and a removal of total compensation caps for these directors). Second, the remaining residual board compensation will be still a sizeable portion of the total compensation package of employee representatives. Therefore, the quest for optimal compensation is also applicable to boards under codetermination, apart of the fact that shareholder representatives will have a casting vote in the event of deadlocks anyway.

(e.g. Elston and Goldberg 2003; Brick et al. 2006). Third, we use detailed compensation information allowing us to examine both the level *and* structure (e.g. the likelihood of companies adopting performance-based pay) of director compensation in a two-tier setting. Specifically, analyzing the structure of compensation packages will further deepen our understanding of board compensation practices. Finally, we also extend the perspective to director compensation: although we follow the standard (finance) approach and derive our main hypotheses based on agency arguments, we challenge our empirical results and their interpretation by also considering alternative explanations, such as institutional theory arguments.

The remainder of the paper is organized as follows. Chapter 2 provides a brief overview of the existing literature on director compensation. Our key hypotheses are developed in Chapter 3. Chapter 4 describes the data set, its sources, variables and the econometric methodology. This also includes descriptive results of director compensation levels and structure over the sample period. Chapter 5 presents regression results and robustness checks. Chapter 6 summarizes and discusses the results and concludes.

2 Related Literature

Issues of director compensation have received increasing attention in recent years. This trend can be attributed to two developments. First, in the light of corporate scandals and the financial crisis, questions are being raised about the role of directors and the adequacy of their incentive schemes (e.g. Ferrarini et al. 2009). Second, an emerging stream of literature is dealing with board involvement and its effect on firm behaviour, such as diversification decisions or R&D strategy (Jensen and Zajac 2004; Pugliese 2009). These studies suggest that director compensation schemes affect corporate decisions (Carpenter and Westphal 2001; Deutsch 2007).

Subsequently, we conduct two literature reviews. The first one is intended to give a broad overview on various conceptual approaches used to explain director compensation policies. These concepts are discussed in detail in Section 2.1. The second one, which is a more systematic review, helps us to identify empirical determinants used to explain director compensation. Section 2.2 discusses these empirical determinants. Section 2.3 brings together conceptual approaches and empirical determinants and then reveals the existing research gap.

2.1. Conceptual Approaches to Explain Director Compensation

Our first, rather broad literature review reveals that researchers use various conceptual approaches to explain empirical patterns of director compensation. Specifically, we identify four different perspectives. First, similar to much of the corporate governance literature, agency-theory is the central paradigm in most studies of director compensation (Adams et al. 2009). Based on the standard assumption of information asymmetries and diverging interests, the common theme of this literature is as follows: the three-level hierarchy of shareholders–directors–management, though initially serving as an instru-

ment designed to mitigate agency problems, is expected to generate agency conflicts of its own (e.g. Kumar and Sivaramakrishnan 2008), for example through collusion between directors and management (Tirole 1986). Hence, director compensation is presumed to be the result of a bargaining process between shareholders and directors, where the former anticipate that directors are likely to pursue their own interests and to extract additional rents (Jensen and Murphy 2004; Bebchuk et al. 2007). Assuming that the bargaining power is completely allocated to suppliers of equity capital, who bear the ultimate risk, shareholders then aim to establish contractual structures that minimize corresponding agency costs (Williamson 1984; Jensen 1993). Based on that *optimal contracting perspective*, agency-based models generally argue for incentive-intensive compensation structures that minimize agency costs (e.g. Kumar and Sivaramakrishnan 2008).³

Second, in particular within the German context, arguments that rely on stewardship theory are commonly used to explain supervisory board behaviour (Bresser and Thiele 2008; Velte 2009). In contrast to the standard agency theoretic assumptions of diverging interests and self-serving behaviour, the stewardship paradigm presumes a natural motivation of the individual to act in the best interest of the organization (Donaldson and Davis 1991; Davis et al. 1997). In that perspective, directors' engagement in supervisory boards is generally based on non-monetary reasons, such as being a good steward of corporate assets, increasing industry networks or tackling important strategic challenges (Bäurle 1996, Fallgatter 2003). Consequently, as (incentive) pay is not believed to drive motivation, only flat compensation packages are expected within this framework.

A third pattern of thought that is occasionally used to explain differences in director compensation is the resource dependency theory (e.g. Boyd 1996). In short, this theory assumes that companies face resource scarcities and therefore will seek to minimize dependence on such factors in order to become more competitive (e.g. Pfeffer and Salancik 1978; Scott 2003). A typical solution is to establish links with other firms to regulate interdependence and reduce uncertainty (Heide 1994). Thus, the resource dependence theory views the supervisory board as a means to provide the firm with access to critical information via board interlocks and multiple directorships (Ornstein 1984; Pfeffer 1972). The level of resource contribution of a board, in particular via its network of directorships, will therefore be a key determinant of its compensation (Boyd 1996; Hung 1998).

³ With respect to the result of this bargaining process, two competing views emerged: the *optimal-contracting* and the *managerial-power perspective* (see Grossman and Hart 1983 and Bebchuk and Fried 2002 for an overview of the arguments). While the optimal contracting view presumes that shareholders establish compensation policies, i.e. the bargaining power is allocated to shareholders but agents will take advantage of information asymmetries, in the managerial power framework agents are able to set their own pay (Ruiz-Verdú 2008). Concerning executive compensation, recent evidence suggests that both perspectives are needed to fully understand existing practices (e.g. Bruce et al. 2005; Schmidt and Schwalbach 2007; Dittmann and Maug 2007; Fahlenbrach 2009).

Finally, whereas the previous theories view the pay-setting decision as a strategic choice of the organization, the institutional perspective suggests that such organizational practices are a result of macro social processes (e.g. DiMaggio and Powell 1983; Judge and Zeithaml 1992). In their seminal paper, DiMaggio and Powell (1983) identify three generic mechanisms that eventually lead to isomorphic structures: coercive forces (i.e. formal political power), mimetic responses (i.e. imitation to reduce uncertainty) and normative pressures (i.e. social comparison and standard setting). Within the context of corporate governance, the introduction of performance-oriented compensation schemes may reflect a need to conform to market expectations and to seek legitimacy which could be predicted by examining industry traditions or peer referents (Aguilera and Jackson 2003; Chizema and Buck 2006).

All four perspectives are also commonly applied in the literature studying executive remuneration. However, while this stream of literature also applies other concepts (e.g. tournament theory), we find no studies applying these concepts on director compensation. The main reason for that might be seen in several peculiarities of director pay schemes.⁴

2.2 Empirical Determinants of Director Compensation

In a second step, we conduct a more systematic review that helps us to identify empirical determinants used to explain director compensation.

2.2.1 Identification Strategy for the Detailed Literature Review

A key characteristic of any systematic literature review is the definition of a consistent identification strategy. For our synopsis we follow a three-step process (e.g. Webster and Watson 2002). First, we define relevant databases (EBSCOHost, JSTOR, ScienceDirect and WISO databases), relevant academic journals and a set of keywords to search within the databases and the specific journals.⁵ Second, after retrieving our keyword search results, we perform a backward and forward search to further assemble our source material. Specifically, we examine the bibliography of our search results to detect prior publications and identify articles citing one of the studies within our initial search results.

⁴ To illustrate, tournament theory has been used in executive compensation studies to provide a theoretical justification for pay differentials among the top management team and its effect on corporate performance (see e.g. O'Reilly et al. 1988; Conyon et al. 2001). However, contrary to executive compensation, director compensation is set for a group of individuals (i.e. the board) as a whole (§ 113 AktG). Interdirectorial differences in compensation stem from assuming additional functions (e.g. chairman or committee membership) or variations in meeting attendance (Farrell et al. 2008).

⁵ The keywords are “board of directors compensation”, “director incentive pay”, “outside director compensation”, “board remuneration” and “board incentive contracts”. The shortlist of key journals includes (amongst others) the Journal of Finance, the Journal of Financial Economics, the Review of Financial Studies and the Journal of Corporate Finance.

Third, we define studies to be *relevant* if they satisfy two criteria. The first is that the analysis specifies some measure of director compensation as a dependent variable. We therefore do not include theoretical or merely descriptive studies (e.g. Speidel et al. 2009 or Schöndube-Pirchegger and Schöndube 2010) and ignore studies that solely consider director compensation as an explanatory variable (e.g. Deutsch 2007 or Kren and Kerr 1997). Second, the study has to be published in a refereed journal. The second criterion is established to ensure an external quality signal.⁶ This screening process yields a total of 17 studies, which we review in detail below.

2.2.2 Empirical Determinants Found in the Literature

Building on the agency framework, much of the empirical research in our survey has focused on whether the empirical observed patterns in pay arrangements are in line with the assumption that shareholders aim to minimize agency costs. To address this question, most studies concentrate on the pay-performance sensitivity of the compensation package under different conditions. The main reason for this approach is the argument that an efficient contract aligns the interests of shareholders and their agents. In other words, efficient contracts are assumed to link compensation (levels) to firm performance in order to reduce conflicts of interest (e.g. Knoll et al. 1997; Yermack 2004). Given the steady improvements in data availability of detailed internal governance characteristics, this group of determinants has attracted increased attention in recent years (e.g. Ryan and Wiggins 2004 or Brick et al. 2006). The reason is that the compensation design is not expected to be decided in a void but, as outlined above, depends on a firm-specific pay-setting process (Barkema and Gomez-Mejia 1998). Alternative governance mechanisms to monitor the management will affect this process and hence will determine the incremental benefit (and cost) of incentive compensation.

The main findings of our survey with respect to determinants used in the empirical models are reported in Table 1 below. We classified the determinants into four groups which are frequently used to structure the influencing factors in compensation studies (e.g. Barkema and Gomez-Mejia 1998): measures of firm characteristics, corporate performance, ownership structure and board structure. Panel A shows the results concerning the determinants of total director compensation; the corresponding results regarding the relevance of incentive-based compensation are shown in Panel B.

<<<<<<<< Insert Table 1 about here >>>>>>>>

⁶ Hence, our review does not consider working papers that deal with director compensation determinants. However, we will refer to them in our development of the hypotheses and the discussion of the results. Relevant papers that we have identified via SSRN are from Perry (1999), Bryan et al. (2000), Bryan and Klein (2004) and Adams (2003). Additionally, we searched the database of the Deutsche Nationalbibliothek for relevant dissertations that have not found their way into refereed journals. We could not find any dissertations that met our requirements.

Regarding the results, most authors highlight the relevance of agency costs in setting director compensation and view their empirical results largely as a confirmation of the optimal contracting argument (e.g. Linn and Park 2005; Ertugrul and Hegde 2008; Farrell et al. 2008). Yermack (2004) further extends this notion and presents additional evidence that the incentives non-executive directors face through compensation seem to matter more than those through reputation or retention decisions. However, some authors also demonstrate borderline cases in which compensation practices cannot be explained by a motive to optimize agency costs alone (Ryan and Wiggins 2004; Brick et al. 2006). Such situations primarily arise when powerful executives encounter weak boards and thus can influence the contract design to provide directors with weaker incentives to monitor (Ryan and Wiggins 2004).

2.3 Existing Research Gap

Again, we note that most of the literature deals with director compensation in the Anglo-Saxon one-tier setting and there is hardly any systematic empirical analysis of the issue within a two-tier setting (exceptions are Schmid 1997, Knoll et al. 1997 and Elston and Goldberg 2003). Data availability is presumed to be one of the primary reasons why evidence from two-tier institutional environments is so far limited, in particular with regard to the impact of corporate governance characteristics (Elston and Goldberg 2003).

All studies in our survey that examine German supervisory boards adopt the agency-theoretic framework (Knoll et al. 1997; Schmid 1997; Elston and Goldberg 2003). In line with the agency perspective, Schmid (1997) and Elston and Goldberg (2003) present broad evidence of pay schemes that correspond with the optimal contracting approach. Thus, the authors conclude that the German two-tier system is characterized by the same type of agency conflicts as observed in the US one-tier setting. Knoll et al. (1997), however, find a negligible (and statistically insignificant) pay-for-performance sensitivity in their study of director compensation and conclude that (in line with the stewardship theory) incentives for German board members must come from other sources than compensation packages.

Our research intends to further advance this debate. Adopting the standard approach, we start to derive our hypotheses from agency-theoretic arguments that predict an incentive design in order to minimize agency costs. This is not only in line with prior research and allows us to compare our results, but also provides a fruitful basis for consistent hypotheses. Moreover, it also acknowledges major corporate governance reforms in Germany relating to the supervisory board during the past ten years which essentially aimed at getting the board out of the "comfort zone" and reinforcing the monitoring function.⁷ However, in the discussion of our empirical results we will also critically challenge our results by considering alternative explanations.

⁷ Various changes in German law strengthened the position of the board and professionalized its service, e.g. Corporation Control and Transparency Act (KonTrAG) 1998 or the introduction of the German Corporate Gov-

3 Testable Hypotheses

In this section we develop testable hypotheses. We use the classification scheme of our literature review as a reference framework. Figure 1 gives a graphical illustration of our general research model and summarizes the hypotheses. We start with firm characteristics and then review performance and governance determinants.

<<<<<<<< Insert Figure 1 about here >>>>>>>>

3.1 Firm Characteristics

Agency theory predicts that director compensation is designed to mitigate agency problems. Accordingly, we expect to see a relationship between the level and structure of compensation and the extent to which agency problems exist. With respect to firm characteristics, we expect a positive relationship between director compensation and firm complexity, which in turn determines the need for corporate monitoring and the required monitoring effort of directors. Firm complexity is often proxied by the firm's size, investment opportunities and incurred risk (e.g. Bryan et al. 2000; Linn and Park 2005). Alternative measures are diversification and firm growth (Adams 2003; Yermack 2004). Evidently, the above arguments also apply to the level and the per-se *existence* of (performance-related) compensation schemes (Jensen and Meckling 1976; Smith and Watts 1992; Yermack 1995). In sum, we expect:

H_{1a}: Firm complexity is positively correlated to the level of director compensation.

H_{1b}: Firm complexity is positively correlated to the likelihood of performance-based pay schemes.

Previous empirical studies largely corroborate the above hypotheses, with the exception of the firm's growth rate and diversification, for which mixed evidence exists (Yermack 2004; Bryan et al. 2004). Evidence from German companies regarding the relevance of firm characteristics has been restricted to firm size to date, for which a positive relationship has also been found (Schmid 1997; Elston and Goldberg 2003).

Furthermore, Jensen (1986) argues that agency costs are a function of a firm's capital structure and develops the well-known debt control hypothesis. Following these arguments, low debt ratios and high free cash flows are expected to be associated with higher levels of compensation and a high likelihood of performance-based incentives (Agrawal and Mandelker 1987; Bryan et al. 2006). Hence, we posit:

ernance Code (DCGK) 2002. See Nowak (2001), Theisen (2003a) and Goergen et al. (2008) for an overview of the legislative efforts and their implications.

H_{2a}: The leverage ratio (free cash flow) is negatively (positively) correlated to the level of director compensation.

H_{2b}: The leverage ratio (free cash flow) is negatively (positively) correlated to the likelihood of performance-based pay schemes.

Again, existing empirical evidence from US firms supports the two hypotheses, in particular with respect to the leverage dimension (e.g. Bryan et al. 2000; Becher et al. 2005). To the best of our knowledge, there is no evidence for the two-tier setting so far.

Finally, studies on corporate governance suggest controlling for the degree of industry competition as an important condition for the severity of the agency problem (e.g. Börsch-Supan and Köke 2002; Bertrand and Mullainathan 2003; Januszewski et al. 2002; Beiner et al. 2009). Fierce product market competition may have a disciplining effect on managers. Specifically, by reducing the managerial discretion it renders additional (monetary) incentives redundant (Schmidt 1997; Grosfeld and Tressel 2002). In line with this reasoning, Nickell et al. (1997) and Giroud and Mueller (2010) present empirical evidence that industry competition might act as a substitute for other governance mechanisms. We therefore hypothesize:

H_{3a}: Industry competition is negatively correlated to the level of director compensation.

H_{3b}: Industry competition is negatively correlated to the likelihood of performance-based pay schemes.

3.2 Corporate Performance

Pay-for-Performance is the central paradigm of the agency-theoretic optimal contracting perspective. It is at the heart of agency theory to expect a positive relationship between corporate performance and the level of compensation in order to align incentives between directors and shareholders (Jensen and Murphy 1990; Jensen 1993). Building on this notion, Maug (1997) demonstrates that compensating directors with performance incentives can alleviate barriers to monitoring and increase shareholder wealth. Similarly, Hermalin and Weisbach (1998) and Gilette et al. (2003) developed formal models where performance-related compensation for directors increases their monitoring efforts. Explicitly modelling the two-tier setting, Schöndube-Pirchegger and Schöndube (2010) show that optimal compensation of directors may consist of stock-based incentives. With these ideas in mind and with regard to the German Corporate Governance Code (DCGK), which recommends director compensation to include (short- and long-term) performance-related components (DCGK 5.4.6), we expect:

H₄: Firm performance is positively correlated to the level of director compensation.

Existing evidence for US firms largely supports the optimal contracting argument (e.g. Yermack 2004; Brick et al. 2006).⁸ For Germany, empirical evidence is mixed: Schmid (1997) confirms a positive and significant pay-performance sensitivity for board members, Elston and Goldberg (2003) find a significant correlation in two out of six equations and Knoll et al. (1997), though observing positive coefficients, do not find any significant correlation at all.

3.3 Corporate Governance: Ownership Characteristics

Ownership structure is considered to be a major governance mechanism (e.g. Holderness 2003). From an agency perspective, concentrated ownership is expected to reduce the need for pay-for-performance as well as to reduce the expected level of compensation. This *substitution effect* is supposed to hold in either case: (large) external blockholders and/or substantial managerial ownership. While in the case of large blockholders this effect is driven by the fact that blockholders are presumed to be efficient monitors and thus in parts may serve as a substitute monitoring by directors, in the case of substantial managerial ownership this effect is driven by the presumably lower agency costs.⁹ Accordingly, we expect:

H_{5a}: Ownership concentration is negatively correlated to the level of director compensation.

H_{5b}: Ownership concentration is negatively correlated to the likelihood of performance-based pay schemes.

So far, existing empirical studies do not provide a clear picture. For instance, some authors find that total compensation is lower in firms with a substantial proportion of shares held by the board or the management (Bryan et al. 2000; Fich and Shivdasani 2005) and in firms with a high ownership concentration (Schmid 1997; Elston and Goldberg 2003). However, other authors find that institutional blockholders are associated with higher levels of compensation (Cordeiro 2000) and a higher probability of adopting performance-based compensation (Perry 1999). For Germany, Schmid (1997)

⁸ Given the wide adoption of stock-based incentive programs in the US, this evidence has been observed to be more consistent based on capital market-related (e.g. total shareholder return) rather than accounting-based indicators (e.g. return on assets). However, in contrast to US findings, we expect director compensation in Germany to be more closely related to accounting-related performance measures compared to capital market performance. Moreover, we expect fewer stock-based incentives for directors in German companies, since the German Federal Court of Justice prohibited the use of stock options as a component of director pay in the 2004 “Mobilcom” decision (BGH II ZR 316/02). As a consequence, only contractual replications such as phantom stocks or stock appreciation rights are permitted.

⁹ Other researchers argue that concentrated ownership represents a prerequisite that shareholders are able to establish efficient contracts and thus suggest a *complementary relationship* (e.g. Hartzell and Starks 2003). A positive correlation between compensation level and governance mechanisms is, however, also in line with a managerial/director power view. See Fahlenbrach 2009 for a thorough discussion of the empirical predictions of these three views for the case of executive compensation.

and Elston and Goldberg (2003) report a negative correlation between concentrated ownership and total compensation.¹⁰

3.4 Corporate Governance: Board Characteristics

Boards can differ significantly in their monitoring abilities, their monitoring effort and their independence, which in turn influences corresponding agency costs (Linck et al. 2008; Fich and Shivdasani 2006). Thus, a natural determinant of director compensation is found in the board composition itself.

Two measures that are frequently used to proxy a board's monitoring effectiveness are its size and the extent to which the directors serve on other boards (e.g. Ryan and Wiggins 2004; Ertugrul and Hegde 2008). It has been argued that larger boards are associated with less effective monitoring, since coordination and decision-making becomes less efficient and, consequently, the ability to exert pressure on the executive management diminishes (Jensen 1993; Eisenberg et al. 1998).¹¹ Similar arguments have been put forward concerning so-called *busy directors*, i.e. directors with multiple directorships (e.g. Core et al. 1999; Fich and Shivdasani 2006; Oehmichen et al. 2009). Accordingly, we posit:

H_{6a}: Board size and multiple directorships are positively correlated to the level of director compensation.

H_{6b}: Board size and multiple directorships are positively correlated to the likelihood of performance-based pay schemes.

Empirical studies from the US again provide mixed evidence. While there are some authors that find evidence consistent with the above hypotheses (e.g. Hempel and Fay 1994; Ertugrul and Hegde 2008), others find evidence against them (e.g. Ryan and Wiggins 2004). Additionally, Boyd (1996) interprets his seemingly consistent results rather as evidence in favour of positive (net) spillover effects, e.g. due to reputational capital or network effects as suggested by the resource dependency theory.¹² So far, there is no evidence for German supervisory boards, although the German board system, which was and still is characterized by an impressive network of interlocking directorates (e.g. Heinze 2004; Goergen et al. 2008, Fockenbrock 2009), provides an interesting research objective for these and related issues.

¹⁰ This is also in line with recent evidence concerning compensation of German executives (Kaserer and Wagner 2004; Rapp and Wolff 2010).

¹¹ Note that due to German regulation, e.g. the Codetermination Act, supervisory boards of German firms are about twice the size compared to the proportion of non-executive directors in boards of a one-tier system (Baums 2001).

¹² While the agency-oriented finance literature is rather sceptical concerning busy directors, there is a large body of management literature that highlights the positive spillover effects of these networks. See Hillman et al. 2008 and Oehmichen et al. 2009 for a discussion.

From an agency perspective, a supervisory board should also be independent of executives. Independent directors are supposed to be less biased and thus more effective monitors (Fama and Jensen 1983; Zajac and Westphal 1994).¹³ Accordingly, independent boards are supposed to be associated with lower agency costs. Adopting the optimal contracting perspective, we hypothesize:

H_{7a}: Board independence is negatively correlated to the level of director compensation.

H_{7b}: Board independence is negatively correlated to the likelihood of performance-based pay schemes.

There is some evidence from US studies that board independence is a determinant of director compensation. However, previous results instead establish a complementary relationship between board independence and (incentive) compensation (e.g. Ryan and Wiggins 2004; Vafeas 1999). It has been argued that this may reflect an ideal of an overall level of effective monitoring that addresses both board composition and compensation (Hermalin and Weisbach 1998). Alternatively, Ryan and Wiggins (2004) suggests that board independence is a prerequisite for efficient director compensation schemes, since powerful CEOs will otherwise use their position to provide director compensation with fewer incentives to monitor. Again, there is so far no evidence for the German two-tier setting.

The final issue that warrants attention is the question of whether director compensation schemes provide incentives for directors to invest effort. Following conventional agency arguments, three studies provide evidence that shareholders not only link incentives to the outcome of boards' actions (i.e. corporate performance) but also to the boards' efforts, which is usually proxied by the number of board meetings (Hempel and Fay 1994; Bryan et al. 2000; Brick et al. 2006). Apparently, although the monetary reward is relatively small, meeting fees play an important role in facilitating effective decision-making and rewarding the increased demands of board service (Adams and Ferreira 2008). Accordingly, we posit:

H_{8a}: The number of meetings is positively correlated to the level of director compensation.

H_{8b}: The number of meetings is negatively correlated to the likelihood of performance-based pay schemes

¹³ Consequently, commentators argue that the board should be dominated by firm-external directors who are expected to be less susceptible to collusion and being captured by powerful CEOs (Lipton and Lorsch 1992; Jensen 1993). This idea has also made its way into German policy reforms: according to a recent amendment to the German Stock Corporation Act, former members of the executive management must await a two-year cooling-off period before they can assume a position on the supervisory board. However, the shareholders' meeting may opt out if the combined stake of the nominating shareholders exceeds 25% (§100 AktG). Additionally, the German Corporate Governance Code recommends a maximum of two seats for former executives in supervisory boards in total. However, some academics raise concerns that boards dominated by outside directors may face negative effects: former executives are supposed to have valuable firm-specific knowledge that reduces information costs (e.g. Donaldson and Davis 1994).

Note that the latter hypothesis is in line with commentators who argue that meeting fees may serve as a non-distortionary substitute for capital- or accounting-based performance incentives (e.g. Siegel 2003).

4 Data, Variables and Econometric Models

4.1 Data

Our initial sample consists of all shares listed in the German Prime Standard over the period 2005–2008. We remove dual class shares in cases where the firm’s ordinary shares are simultaneously listed, to ensure that our sample covers every firm only once. Moreover, we remove all financial companies (defined as SIC codes 6000-6999) and companies with a foreign ISIN, since both the economic and regulatory environment as well as the governance structure are likely to differ (Farrell et al. 2008; Ryan and Wiggins 2004). Finally, we drop firm-years in which the firm is acquired, merged or filed for bankruptcy. We finally end up with an unbalanced panel of 1,181 firm-year observations for which we collect information regarding corporate, performance, and governance characteristics.

Unfortunately, there is no official or publicly-available database offering access to detailed corporate governance information for German firms. Accordingly, we set up a unique database containing hand-collected data on ownership structures, compensation structures and board characteristics. For this purpose, we consulted various sources, in particular annual reports, the Hoppenstedt Aktienführer and the Lexis-Nexis database, and undertook a press search and made requests to investor-relations departments. For the financial data, we used Thomson Worldscope and Datastream.

We restrict the sample to firms that have at least three years of data for the variables of interest.¹⁴ Due to this restriction and some minor problems of limited reporting transparency, our final sample consists of 928 firm-year observations. Despite the challenge of proxy availability, this is about double the cross-sectional size of prior publications based on German data (Schmid 1997; Knoll et al. 1997; Elston and Goldberg 2003), and in particular increases inferences to medium and small-sized companies.

¹⁴ This condition was introduced because we want the samples to be exactly the same when comparing coefficients across regression models. Otherwise, the computation of likelihood-ratio tests comparing models cannot be completed and any interpretations of why the results have changed must take into account differences between the samples. In addition, we decided to track stock volatility over a 36-month period requiring at least three years of data preceding any sample year.

4.2 Variables and Descriptive Statistics

4.2.1 *Dependent variables*

For our empirical analysis we define two endogenous variables. Our first variable is total compensation per director, which is calculated by dividing total board compensation (in euros) by the number of directors. In this way, total board compensation is defined to be equal to the sum of all annual fixed fees, meeting and committee fees and additional (short- and long-term) performance-based bonus payments. We do not consider other rewards received by directors that are partly disclosed in the annual report, for example for providing (board-external) consulting services or license royalties. Note that we follow the standard approach used in other studies, and examine average director compensation, which reflects the compensation of an average director serving on the firm's board.¹⁵

Our second variable is a dummy variable indicating whether or not a firm has adopted a performance-related compensation component for directors. We therefore do not differentiate between dividend-, accounting- or stock-based compensation schemes.

Descriptive statistics for key director compensation variables that we collected for the revised sample of Prime Standard companies are presented in Table 2 below. We divide the table into two panels that report data on the level and structure of director pay.

<<<<<<<< Insert Table 2 about here >>>>>>>>

Based on the penultimate column in Panel A, average total board compensation per director was €42,319 in 2008. This equals a compounded annual growth rate of approx. 9.5% since 2005. Remarkably, despite the impact of the starting economic downturn on performance-based pay, average total compensation still increased by about 7.7% in 2008. Thus, our survey traces a steady catching-up process from traditionally low director compensation levels. To illustrate, the latest US figures in Farrell et al. (2008) report average total compensation of \$147,300 in 2004 (€118,500 based on historic exchange rates) compared to €32,152 for German Prime Standard companies in 2005. This development has continuously been encouraged by governance experts and recent governance reforms (Theisen 2003b; Schwalbach 2004).

In addition, an increasing number of listed German companies have begun to gear their compensation to professional structures. A gradually-increasing majority of 62.3% of the Prime Standard

¹⁵ We are aware of the fact that this approach does not differentiate between different board members (e.g. chairman and ordinary directors) and may introduce a bias into our compensation data if board composition changes during the financial year. However, we chose this approach as it would take enormous effort to compile the relevant data at director level. Additionally, only roughly two-thirds of the companies disclose information about individual pay levels, which would in turn further restrict our sample. Finally, by following this procedure we connect to all prior German studies which also applied this calculation (Schmid 1997; Knoll et al. 1997; Elston and Goldberg 2003).

companies have now introduced performance-based pay as part of the compensation system. On average, this pay component already constitutes approx. 20% of the total compensation, making this a substantial share of the total package. Furthermore, companies increasingly tie compensation to the boards' efforts and the tasks they carry out. About one-third of the companies grant fixed fees for each meeting attended. Moreover, committee fees, for example rewarding work in audit committees, were adopted in almost half of the companies in 2008. These findings illustrate that the companies seem to increasingly differentiate the compensation design to produce the best possible performance on the part of their directors.

4.2.2 *Independent variables*

We consider a comprehensive set of variables to examine the determinants of director compensation, specifically measures of firm characteristics and performance as well as proxies for corporate governance characteristics. Table 3 in the Appendix gives an overview of variable definitions and sources.

Firm Characteristics: We define the *Size* of the firm as the natural logarithm of total assets and use the total debt to total capital ratio (*Leverage*) and the *Free Cash Flow* as proxies for the influence of the capital structure (e.g. Schmid 1997; Ertugrul and Hegde 2008). The set of *Investment Opportunities* and the *Risk* faced by stockholders investing in the firm are measured by the firm's market-to-book multiple (Linn and Park 2005; Farrell et al. 2008) and the volatility of stock returns, respectively (Adams 2003). We account for product market *Competition* by calculating aggregated industry-specific rents (Januszewski et al. 2002).

Corporate Performance: In our analysis, we address both capital market- and accounting-based measures of corporate performance. In doing so, we hope to shed light on the pay-performance relationship, since all prior contributions based on German data have only considered either one of the dimensions and produced rather inconclusive results (Schmid 1997; Knoll et al. 1997; Elston and Goldberg 2003). As a proxy for capital-market performance we use total shareholder return (*TSR*) and also the *Dividend Yield*, because dividend-related compensation has been widely adopted in Germany in the past as opposed to stock-based incentives (Andreas et al. 2009). In line with other studies, we use the return on assets (*ROA*) and, as an alternative proxy, the return on invested capital (*ROIC*) as measures for (operating) accounting-based performance (e.g. Ertugrul and Hegde 2008).

Corporate Governance – Ownership Structure: We control for the majority of ownership variables that were previously examined in prior studies. First, a Herfindahl index is used to measure the degree of *Ownership Concentration* (Schmid 1997). In line with other studies, we also include the variable *Management Ownership*, which measures the proportion of voting rights accumulated in the hand of executives (Bryan et al. 2000; Ertugrul and Hegde 2008). In addition, we explore the role of blockholders in more detail. First, we examine the role of an *External Blockholder* in general (Vafeas 1999; Cordeiro 2000), which we measure as a voting-power weighted dummy variable measuring the relative share of non-management blockholders if the voting power exceeds 10% of the shares. Paralleling

prior studies, we also consider the role of *Institutional* investors, which we also measure by a voting-power weighted dummy variable at a 10% threshold (e.g. Schmid 1997; Cordeiro 2000; Bryan et al. 2004).

Corporate Governance – Board Characteristics: We define *Board Size* as the number of supervisory board members (including employee representatives in the event that the firm operates under codetermination). To measure directors’ busyness, we define *Directorships* as a dummy variable that equals 1 if 50% or more of non-employee board members hold a minimum of three additional directorships at other companies (e.g. Fich and Shivdasani 2006; Ferris et al. 2003). We proxy monitoring effort by measuring the number of board meetings (*Effort*) (Hempel and Fay 1994; Brick et al. 2006). Moreover, we proxy *Chairman Independence* by an indicator variable that equals 0, 1, 2 or 3 whenever the current chairman is a founder of the firm, a former firm executive, an external director with industry experience or an external director without industry experience, respectively.¹⁶ Finally, we account for the board’s background and measure *Professional Directors*, defined as the proportion of all non-employee board members that are full-time directors.

<<<<<<<< Insert Table 4 about here >>>>>>>>

Table 4 presents descriptive summary statistics for all the variables used in this study for our final sample of 928 firm-years. Means and medians paint the picture of the average company in our sample. With respect to the supervisory board, we find on average 7.9 directors who meet 5.6 times per year. In 29.6% of all firms we find boards with busy directors; full-time directors account for 20.2% of board members and 22% of all boards are chaired by a former firm executive.

Looking at firm characteristics, corporate performance and ownership variables suggests that agency costs differ substantially between companies. For most of the variables the standard deviation is at least as high as the variable’s mean. For example, the market-to-book ratio has a mean of 2.2 and a standard deviation of 2.7. It is the primary aim in the following regression analyses to explore whether these variations also result in different compensation designs as suggested by agency theory.

In Table 4 we also present maximum variance inflation factors for each variable as they occur in the subsequently-estimated empirical models to check whether these models suffer from (multi-)collinearity. The results suggest that this can be rejected, as all VIFs are well below conventional levels (Chatterjee and Price 1977).

¹⁶ While in the US context commentators are concerned about the role of the CEO, in particular in the case of CEO duality meaning that the CEO is simultaneously chairman of the company, for the two-tier setting, and Germany in particular, it is rather the role of the chairman of the supervisory board that is controversial. One of the reasons for this is the dominance of the chairman, which constitutes itself in the privilege of having a casting vote if elections between shareholder and employee representatives are tied.

4.3 Econometric Models

With respect to the level of director compensation we estimate variants of the following empirical model:

$$\text{LN(Compensation per Director}_{it}) = f(\text{Firm Characteristics}_{it}, \text{Corporate Performance}_{it}, \text{Ownership Structure}_{it}, \text{Board Characteristics}_{it}) \quad (2),$$

relating the level of director compensation to our four determinants. Thereby, we take the logarithm of total compensation per director as the dependent variable to account for the skewness in the compensation level variable (e.g. Linn and Park 2005; Farrell et al. 2008; Fahlenbrach 2009).

Our data set covers a broad set of firms in the cross-section and spans a time period of four years. This allows us to use panel data methods. Panel data analysis is the most efficient tool to use when the sample contains both cross-sectional and time-series data, since it allows unobservable and constant firm heterogeneity (e.g. managerial philosophy or general demand instability) to be accounted for by including individual or industry-specific effects (Baltagi 1995). Omitting these variables at best renders the estimates inefficient and can produce biased and inconsistent results if the effects are correlated with other regressors (Greene 2003). Many authors therefore argue that panel data and corresponding estimation methods are necessary to properly identify the effect of corporate governance mechanisms (e.g. Börsch-Supan and Köke 2002; Elsas and Florysiak 2008). For instance, Murphy (1985) argues that certain companies might offer particular compensation contracts for reasons that are unknown or unobservable.

In line with these arguments, most recent studies analyzing executive and director compensation contracts rely on panel data models. Linear models that allow for (constant) firm heterogeneity can be written as follows:

$$y_{it} = \alpha_i + x'_{it} \beta + \varepsilon_{it} \quad (1)$$

where y is the endogenous variable, $i=1, \dots, N$ is a firm index, $t=1, \dots, T$ is a year index, α_i is a firm-specific (but time-invariant) effect, x_{it} are the regressors and ε_{it} is an idiosyncratic error.¹⁷ In equation (1), the parameter α_i is a firm-specific intercept that accounts for the unobserved heterogeneity.¹⁸

¹⁷ Equation (1) describes a general one-way fixed-effects model where α_i is the coefficient of a firm-specific dummy variable. In a random-effects model, the firm-specific effect is presumed to be random with $\alpha_i \sim (\alpha, \sigma_\alpha^2)$ and $\varepsilon \sim (0, \sigma_\varepsilon^2)$. A standard extension of the individual effects model is a two-way effects specification that allows time effects to be incorporated as well. Then, $y_{it} = \alpha_i + \gamma_t + x'_{it} \beta + \varepsilon_{it}$, where γ_t are time-variant (but firm-invariant) effects. Since it is common to assume that the time effects are fixed effects, i.e. non-random, the latter equation reduces to equation (1), where the regressors include time dummies. We include time dummies in all our regression models.

A key econometric question is whether to model α_i as a fixed or random effect, as both techniques have their own advantages and disadvantages (e.g. Wooldridge 2002). A fixed-effects model assigns a dummy variable to each unit (i.e. companies in our analysis). This procedure essentially cancels out any between-variation across different companies. It comes, however, for the benefit of consistent estimates, even if other explanatory variables are correlated with the firm effect (Greene 2003). This provides a fundamental advantage of fixed-effects models compared with random-effects models, which require the firm-specific effect to be exogenous (Wooldridge 2002). However, if the firm-specific effect is exogenous, then random-effect models are more efficient because they consider both between and within variations. Consequently, the issue of correlated errors is the key driver in deciding between fixed- and random-effect models (Mundlak 1978).¹⁹ Baltagi et al. (2003) suggest a testing strategy that is centred around the Hausman test (Hausman 1978).²⁰ Adopting this approach in our analysis, we find that the exogeneity assumption of the random-effects model cannot be rejected (see Section 4.3). Thus, we apply random-effects models in our analysis but conservatively report two-way firm-fixed effects regressions as additional robustness checks.

With regard to the structure of director compensation, we study the likelihood of performance-related pay. This is measured as a dichotomous variable that is coded 1 if the firm makes use of this pay component and 0 otherwise. We use a population-averaged logit model to account for the binary nature of our dependent variable. This yields the following regression model for our second analysis:

$$\Pr(\text{Performance-based Pay}_{it}) = f(\text{Firm Characteristics}_{it} + \text{Ownership Structure}_{it} + \text{Board Characteristics}_{it}) \quad (3)$$

¹⁸ We use a Breusch-Pagan LM test to examine whether allowing for firm level heterogeneity improves the fit of our compensation level models (Breusch and Pagan 1980). The null hypothesis that the variance of the group-specific errors component α_i of groups is zero is rejected at $p < 0.001$, suggesting the use of a firm effects model (see Table 5).

¹⁹ Another way of discriminating between random and fixed effects is to define the target of inference (Wooldridge 2002). A random-effects model is more appropriate if the interest of inference relates to a population mean, i.e. units are viewed as sampled from an overall population. In contrast, fixed effects are more suitable if the interest concerns the particular units in the dataset at hand.

²⁰ The standard Hausman test that is built in most statistical packages requires the random-effects estimator to be efficient, which in turn requires that α_i and ε_{it} are i.i.d. (Cameron and Trivedi 2005). However, this is an invalid assumption if cluster-robust standard errors differ substantially from ordinary standard errors, which is usually the case in panel estimations (Petersen 2008). Here, a robust version of the Hausman test is needed (Wooldridge 2002). In our analysis, we use a panel-robust version that is described by Arellano (1993) and Wooldridge (2002:290-291).

As opposed to the linear regression described above, the transformation to account for the unobservable effects on a firm level is more complicated in a binary response model.²¹ We therefore estimate equation (3) as an industry-fixed effects model by including industry dummies based on the Fama/French 12-industry portfolio (Fama and French 1997). We thus assume that unobservable firm specific factors are reasonably well captured by the industry affiliation, which is a well-established practice in US compensation literature on performance-based pay adoption (e.g. Perry 1999; Fich and Shivdasani 2005).

Finally, we estimate all regression models with robust standard errors that allow for clustering on a firm level to account for the special correlation structure of panel data (Arellano 1987; Petersen 2008).

5 Results

In our empirical analysis, we proceed in three steps. First, we examine the determinants of the level of board compensation. Second, we examine determinants of performance-based compensation schemes. Finally, we challenge our results by a series of robustness tests.

5.1 Determinants of Total Director Compensation

In the first step, we examine the level of director compensation. For this, we regress the level of director compensation on various exogenous variables proxying firm, performance, and corporate governance characteristics. To account for the panel data structure, we use a random firm- and fixed-period effects model. Results are reported in Table 5.

<<<<<<<< Insert Table 5 about here >>>>>>>>

²¹ For example, in short panels like ours where $N > T$, consistent estimation of firm-fixed effects by simply including individual intercepts is not possible due to the incidental parameters problem (Cameron and Trivedi 2005). An alternative would be the specification of a conditional logit model (Baltagi 1995; Greene 2005). However, as a consequence all companies that exhibit no variation in the dependent variable over time would be dropped. As this is the case in the vast majority of all companies examined in this study (approx. 90%), application of the conditional logit model would induce major inefficiency and is hence less favorable. Similarly, specifying the intercept as a random variable places heavy restrictions on the data such as low intra-class correlation and only a limited numbers of clusters in order to achieve stable results during quadrature approximation (Lesaffre and Spiessens 2001; Rabe-Hesketh et al. 2005). With cluster size over 200 and a high intra-class correlation (>90%), our results change considerably (i.e. greater than a relative difference of 10^{-2} in coefficient estimates) when we refit random-effects logit models with different numbers of integration points. Thus, although we get similar results to those reported in Section 4.2 when specifying a random-effect logit model in the default mode in Stata, we choose to restrict our presentation of results to population-averaged models only.

Column A1 in Table 5 provides initial evidence that levels of director compensation are systematically related to firm characteristics. We find corporate size to have a positive and significant effect on compensation levels and also that growth opportunities and risk exhibit positive – yet insignificant – coefficients. In tandem, these findings support our hypothesis H_{1a} that the firm’s complexity and growth potential play a major part in explaining director pay. The coefficient of *Size* implies that doubling the firm size is accompanied by a 26% increase in total director compensation. Notably, with this figure we replicate an almost identical elasticity found in other (director) pay studies in German companies, which also report coefficients of approx. 0.2 concerning the influence of corporate size on compensation (Schmid 1997). In line with contracting theory and our second hypothesis, we also find capital structure characteristics to be a significant predictor. Larger amounts of excess cash results in higher compensation levels (Jensen 1986). The coefficient of *Leverage* is significantly negative, highlighting the disciplinary role of debt. However, we cannot support a significant nor substitutional influence of industry competition on total director pay (H_{3a}).

The models B1–B3 introduce measures for corporate performance. We do not find support for significant pay-performance sensitivity on the basis of total shareholder return (*TSR*). This result retraces previous descriptive publications that find only a low prevalence of stock-based incentives for directors in German companies in general.²² In contrast, dividend- and accounting-based performance measures prove to be relevant. *Dividend Yield*, *ROA* and *ROIC* show a positive and significant pay-performance sensitivity across all regressions, which also reflects the wide adoption of those criteria for performance-based pay (Andreas et al. 2009). However, from an economic perspective this relationship is not very strong: An *ROA* increase of one percentage point will increase compensation levels only by 0.8%.²³

²² Andreas et al. (2009) show that only 4% of Prime Standard companies who have adopted short-term performance-based pay for directors tie the incentive plan to stock price development. Similarly, Knoll et al. (1997) do not find a significant relationship in their regression results using stock-based performance indicators.

²³ In fact, there is a controversial discussion in Germany about whether or not compensation packages of directors should be tied to firm performance at all. Opponents regularly argue that reliable performance criteria that board members can actually influence are not available. Moreover, they point to the stewardship theory outlined above and generally question the extrinsic motivation structure of directors (e.g. Fallgatter 2003; Böcking 2004). From their perspective, compensation should, if at all, be exclusively tied to the input dimension of performance, for example meeting attendance. This view is also generally supported by labour unions (Seyboth 2003). However, proponents of performance-based compensation bring forward a series of arguments that illustrate how supervisory boards can increasingly influence the firm's performance, for example via management decisions that must be subject to the board’s approval or by indirectly framing the management's behaviour (e.g. Lutter 2001; Fallgatter and Simons 2003). Additionally, based on formal models of a two-tier setting, others emphasize the function of performance-based compensation to provide for congruent interests, to prevent collusion or to attract and retain scarce talent (e.g. Martens 2000; Hartmann 2003).

Models C1 and C2 further extend the specification to governance characteristics. The results suggest that governance mechanisms do influence the level of director compensation according to the substitution hypothesis postulated in hypothesis H_{5a}. The coefficients of all introduced variables are negative, indicating that shareholders respond with lower levels of compensation if they have alternative instruments in place to monitor directors more directly (Schmid 1997; Bryan et al. 2004). This can for example be assumed if the executive management already participates in stock value gains (*Management Ownership*) or when there is strong ownership control (*Ownership Concentration*).

Turning to column D1, we find evidence that board characteristics are also correlated with compensation levels - yet, not generally in the way we have hypothesized. First, we find a significant but inverse relationship between board size and compensation levels (H_{6a}). This could be the secondary effect of generally lower adoption levels of performance-based pay components in larger boards (Ryan and Wiggins 2004) which is why we leave the interpretation to the next section. Furthermore, we find significant evidence that total compensation levels per director increase with the share of professional, i.e. more independent, board members (H_{7a}). A possible explanation that conforms to agency theory is that those directors have higher opportunity costs (i.e. reservation values) which imply an increased total compensation (Linn and Park 2005).²⁴ However, we can confirm our hypothesis H_{8a} that assumes a contract design to promote directors' willingness for exertion: Our findings provide evidence that compensation levels are positively related to directors' effort, which is expressed as the number of board meetings. This follows our descriptive results that about one-third of the companies provide fixed rewards for meeting attendance (see Table 2).

5.2 Determinants of Performance-based Pay

In the second step, we examine determinants of incentive structures. In particular, we study the existence of performance-related pay components, which are intended to further align the incentives of directors and shareholders (Morck et al. 1988). Thus, the following analyses can also be regarded as an initial robustness check, since the results should ideally correspond to the pattern observed for the compensation levels described above. In Table 6, the factors distinguishing between director performance-based pay adopters and non-adopters are examined jointly in population-averaged logit regressions.

<<<<<<<< Insert Table 6 about here >>>>>>>>

We start in Column 1 with a basic model that covers key corporate and governance characteristics. In general, we find that even this simple model is reasonably good at predicting the probability of performance-based pay. The estimates of the basic model confirm previous results regarding the level of director compensation: we find a positive and significant influence of *Size* and *Free Cash Flow* on

²⁴ In fact, there is recent evidence that professional directors increasingly become a scarce resource (e.g. Engeser 2009; Prange 2009).

the existence of incentive pay and an inverse relationship concerning the *Leverage* ratio. Again, it is firm size that has the biggest economic impact: an increase in firm size by one standard deviation more than doubles the odds of having a performance-based pay component, whereas the odds decrease by (only) 23% if the leverage ratio increases by the same magnitude and all other variables are held constant. Interestingly, the coefficient of *Risk* is negative across the models and thus not in line with our hypothesis H_{1a} . A possible explanation is that risky companies may be particularly reluctant to accept incentive-based compensation because those companies face greater difficulty (and thus higher costs) when using those contracts, given the risk-aversion of corporate directors (Beatty and Zajac 1994; Anderson et al. 2000). We also find an inverse relationship with regard to product market competition, which suggests that a substitution effect might be limited to incentive pay adoption (H_{3b}).

Moving forward through Columns 2–5, the full set of variables is gradually introduced in the regressions. Most coefficients appear as hypothesized and remain significant throughout the analysis. Similar to the results regarding the compensation levels, the consonance of a negative impact of the ownership variables prevails across the specifications (H_{5b}). Notably, we also find a significant impact of institutional blockholders on the likelihood of performance-based pay – with economically-relevant effects. More precisely, a *c.p.* increase by one standard deviation in institutional ownership will decrease the odds of incentive pay by a factor of 0.7, when other variables are constant. This supports prior literature suggesting that large shareholdings by financial institutions can facilitate effective monitoring and thus obviates additional incentive compensation (e.g. Cronqvist and Fahlenbrach 2009).

Finally, we get a largely consistent picture compared to our hypotheses and the previous section when looking at the board characteristics. Conforming to the need for board monitoring, we find a higher probability of performance-based pay in boards composed of directors who serve on multiple boards simultaneously (H_{6b}). This reflects the common concern that too many other mandates will jeopardize the monitoring function of the board (Fich and Shivdasani 2006). As hypothesized, we also observe a lower probability in companies with a larger share of professional directors (H_{7b}). This also corresponds to the results of the previous section: it seems that increased independence of board members obviates additional performance incentives but does not necessarily decrease total compensation, because the marginal productivity and thus the reservation values of those board members is higher. Additionally, we find that the likelihood of performance-related pay decreases in larger boards, which provides an explanation as to why we have observed an inverse relationship between total pay and board size. However, this is still surprising because we expected as part of hypothesis H_{6b} that larger boards would receive higher incentives since those boards encounter more severe agency problems (Jensen 1993; Eisenberg et al. 1998). A possible explanation for this result is that increases in board size are most often accompanied by the implementation of a board committee structure (e.g. audit or compensation committees). Boards that have adopted special committees are more likely to spend more time and effort understanding the company's (financial) processes (Engel et al. 2010). Thus,

board committees could act as a substitute for performance-related pay, which is reflected in an inverse relationship between board size and the probability of incentive pay. Another explanation could be the German corporate governance system of codetermination under which the number of seats for employees increases with firm (and thus board) size. Increased control rights for labour representatives could lead to a lower prevalence of incentive pay, since unions have generally rejected performance-based pay components for supervisory boards in the past (Seyboth 2003). Finally, as in the preceding analysis, we do not find the chairman characteristics (H_{7b}) to have significant predictive power.

In addition to odds ratios, we want to further explore the economic impact of the explanatory variables. In contrast to a linear regression, the nonlinearity of the logit model makes it more difficult to draw direct inference from the estimated coefficients (Wiersema and Bowen 2009).²⁵ Alternatively, it is suggested that the results are plotted graphically, since this inherently accounts for differences in predicted probabilities (Hoetker 2007; Zelner 2009). In Figure 2, we therefore present conditional effects plots of the marginal effects of selected corporate and governance characteristics based on the estimates in Table 6.

<<<<<<<< Insert Figure 2 about here >>>>>>>>

Ceteris paribus (i.e. holding the other variables at their mean), Graph (a) shows a gradual increase in the predicted probability of performance-based pay adoption if firm size increases, demonstrating a clear positive effect of firm size on incentive-pay adoption. In addition, this positive influence is significant throughout the range of firm sizes, since the 95% confidence interval of the predicted probabilities does not extend below zero.²⁶ At the mean value for firm size (i.e. for the “average” firm), the predicted probability of having a performance-based pay component is approx. 68%. This predicted probability is quite sensitive, underlining the odds ratio described above. The three other graphs show the predicted probability against firm size depending on (b) different levels of institutional ownership, (c) whether the board is busy, and (d) depending on the share of professional directors sitting on the board. The directions of influence of these variables reflect the regression coefficients above. Differences in probabilities are noticeable with regard to institutional ownership: c.p. the likelihood of performance-based pay is approx. 49% if the firm is dominated by institutional investors, which is represented by the dashed line in Graph (b). In addition, the economic impact of the board characteristics compared to firm size and institutional ownership is rather limited. To illustrate, the difference in predicted probability on whether the board is composed of busy directors is approx. 11% (see Graph (c)), holding all other variables at their mean. The likelihood will also decrease by only 5% compared to the

²⁵ This is because the variables’ marginal effect on the dependent variable will vary with the magnitude of change in the variable of interest, the variables’ starting value, and the value of all other model variables (Long and Freese 2006).

²⁶ However, we see that the confidence interval is smaller near the centre of the data and increases as we move to smaller companies, where our dataset has comparatively few observations.

base scenario if the board is dominated by professional directors (Graph (d)). Interestingly, the marginal effects of board characteristics gradually diminish as firm size increases. This is consistent with the belief that director characteristics tend to matter more in smaller companies, which have smaller boards and where the relative power of the board members is higher (Ryan and Wiggins 2004). In unreported results we have rerun the conditional effects plots with other selected variable values. In both cases we find firm characteristics to have the largest impact, followed by ownership and board characteristics, which tend to adjust the predicted probability incrementally.

5.3 Additional robustness tests

Finally, we conduct various robustness checks to ensure that the observed results are robust and not due to spurious correlation, for instance. We pay special attention to the problem of endogeneity (Hermalin and Weisbach 1998).

Endogeneity problems arise most frequently when an unobserved variable simultaneously determines the dependent and independent variable or if the direction of causality between the included variables is not clear (Börsch-Supan and Köke 2002). A remedy is the use of a multitude of control variables, panel data and corresponding models that take the unobserved into account. In our analysis, we addressed this issue by including a comprehensive set of variables for financial, ownership and board characteristics that have been considered important in the literature and by employing panel estimation techniques that control for unobserved corporate heterogeneity. In Section 3.3, we already discussed whether the effects of clusters should be treated as random or fixed in the analysis of director compensation levels. Firm-fixed effects relax the assumptions that the random intercept is uncorrelated with the regressors (Greene 2003). We can also view this approach as an instrumental variable estimate, since firm-fixed effects use only intra-firm deviations and deviations from the cluster mean $x_{it} - \bar{x}_{it}$ are correlated with x_{it} but uncorrelated with the random intercept (Rabe-Hesketh and Skrondal 2008). In Table 7, we have rerun the models on director compensation level determinants controlling for firm-fixed effects. The results are largely similar to those reported in Section 4.1, which are also documented in the results of the panel-robust Hausman tests shown in the last row of the table. We only see a qualitative difference in the level of significance of the *Effort* and *Chairman Independence* variables, which ceases to be significant for the former and becomes significant for the latter. However, variance decomposition shows that for both variables in particular there is much more variation across companies (between variations) than over time (within variation).²⁷ Thus, the within-estimate may lead to efficiency loss since estimates are based on only a few observations (Zhou 2001). With some caution, we therefore assume that the impact of both variables on compensation levels is better captured by the random-effects model.

<<<<<<<<< Insert Table 7 about here >>>>>>>>

²⁷ For example, 84.5% of the chairmen characteristics will remain constant over the sample period.

Regarding the problem of reverse causality, we assume that our performance measures could be affected. Based on contracting theory, corporate performance is expected to drive compensation levels, but it may be that better-compensated directors also positively influence corporate performance (e.g. Fich and Shivdasani 2005). To address this issue, we conducted a Durbin-Wu-Hausman test to evaluate the severity of the problem for our performance variables. This test examines the statistical difference between OLS and 2SLS estimates of the suspect endogenous variable (Wooldridge 2002). However, the null hypothesis of exogenous variables is not rejected well above conventional levels, indicating that endogeneity among the performance measures would not have deleterious effects on OLS estimates (Davidson and MacKinnon 1993).

Finally, we re-estimated the binary dependent logit models with a more granular set of industry dummies (see Table 8). We extended the range of controls to the 48 Fama/French industry portfolio (Fama and French 1997), which also restricts the sample size to fewer observations.²⁸ Although we lose some power, all results are qualitatively similar to those reported in Section 4.2. In summary, these findings underline that the general pattern which we observed in the previous section remains robust even when we put more severe restrictions on the data.

<<<<<<<< Insert Table 8 about here >>>>>>>>

6 Discussion and Conclusions

Directors represent an important corporate governance mechanism: they perform the critical functions of appointing, monitoring and, where required, providing strategic advice to the firm's management. However, directors are delegated monitors and thus shareholders face the well-known trade-off between incentives and control for directors. Since there is only limited room for monitoring directors, it seems reasonable to assume that incentives will play a major role. In fact, empirical evidence from the US suggests that a growing number of companies are adopting compensation structures that aim to align interests of directors and shareholders, for instance by introducing equity-based incentives. However, American studies only provide evidence for the one-tier setting and so far there has been hardly any systematic empirical analysis of the issue within a two-tier setting. Thus, we empirically examine the level and structure of director compensation in Germany, which is considered to be the prototype example of a large economy that has established a two-tier system.

Using a novel, hand-collected data set covering German Prime Standard firms for the period 2005–2008, our descriptive analysis reveals that the average compensation per director is rather low at some €38,000 and only 61.2% of firms use performance-based compensation elements. However, we find a steady upward trend in director compensation and a general movement towards an increased utilization of variable pay components such as performance-related incentives or fixed fees per meet-

²⁸ This is because some observations had to be dropped since some industries perfectly predict (non-)adoption.

ing attended. These descriptive results document an ongoing process to more professional levels and structures that meet the demands and risks associated with board service and that do not simply reward directors with a mere representative allowance (Theisen 2003b; Schwalbach 2004).

Building on agency arguments and evidence from the one-tier setting, we distinguish four types of determinants of director compensation: firm characteristics, corporate performance, ownership structure and board characteristics. Using panel data methods that allow for unobserved heterogeneity, we find that despite the dominating effect of firm size in setting director pay, there is also significant support of our hypotheses that director compensation is related to corporate performance, ownership structure and board characteristics. First, we find a positive, though rather weak, link between (operating) accounting-based measures of corporate performance and compensation levels. These results contribute to prior research regarding the pay-performance sensitivity on German boards, which were found to be inconsistent at first glance. Our results indicate that the derivation of the firm's performance measure matters: we reproduce positive and significant relationships for accounting-based criteria (such as Schmid 1997 and Elston and Goldberg 2003) and similarly find insignificant results for a stock return measure (like Knoll et al. 1997). Therefore, previous contributions must be seen as complementary rather than conflicting, since they employ either capital market- or accounting-based measures. The results reflect the German institutional context in which stock price-related compensation elements for directors are of only minor importance (Andreas et al. 2009). Second, our results suggest that compensation levels and the likelihood of performance-based pay contribute to solving the weaknesses of other governance mechanisms as outlined by the substitution hypothesis (e.g. Fahlenbrach 2009). We find companies to have lower incentive levels when ownership is more concentrated or with (institutional) blockholders as shareholders, which are usually characterized by effective monitoring. Finally, we also provide evidence that specific board characteristics such as multiple directorships are associated with monitoring deficits and thus influence the pay arrangement. However, the impact of board characteristics is generally lower and less consistent compared to the other groups of determinants. Overall, we conclude that compensation of directors is structured in a way to provide incentives to monitor executives, particularly in firms with otherwise weak governance mechanisms.

However, we note that our results have to be treated with some care, since our interpretation crucially depends on the assumption that the compensation scheme is a product of organizational will and not of (macro) institutional pressures. The latter perspective, as outlined in Section 2.1, would suggest that a firm's adoption of new standards is rather a response of seeking legitimacy (DiMaggio and Powell 1983; Granovetter 1985). Put differently, a compensation scheme is introduced to increase market appreciation by signalling commitment and keeping up with global industry peers (Aguilera and Jackson 2003; Chizema and Buck 2006). Could it be that our results are thus camouflaged in that the pay arrangement only symbolically accounts for agency costs? This question is difficult to answer because it is not easy to isolate the effects, since both explanations ultimately lead to the same outcome (Heu-

gens and Lander 2009). However, we believe that there are indications that the institutional lens would be overly deterministic. First, with regard to our descriptive results, we cannot detect a mimic isomorphism in the level and structure of director pay (see Table 2), which also corresponds to a recent survey of DCGK compliance levels (Werder and Talaulicar 2008). For instance, there is still a significant proportion of companies in our sample (app. 48%) which do not grant any performance-based incentives, which illustrates that the relevant actors have much discretion in their decisions. This argumentation is further supported if we take into consideration that the strength of isomorphic forces is a function of its diffusion (DiMaggio and Powell 1983). Second, if we assume that companies seek legitimacy with the capital market and want to signal progressive leadership, then we would expect a positive relationship between institutional ownership and performance-based incentives (e.g. Brandes et al. 2006; Chizema 2008). However, our analysis cannot support such a proposition. Thus, we believe our results are in closer spirit to studies which suggest that the influence of institutional pressures on organizational conduct is rather limited (e.g. Nowak et al. 2005; Heugens and Lander 2009).

If we accept this premise, then some general conclusions can be drawn from our analysis. Our results largely reflect the pattern that compensation is cautiously structured to promote effective monitoring in the shareholders' interest. There is neither a "one size fits all" solution of high-powered incentives, nor is compensation irrelevant as stipulated by the stewardship theory. Essentially, we find that firms choose the pay arrangement depending on a firm-level assessment of the costs and benefits, in particular with regard to other governance instruments such as increased direct monitoring or increased board independence. If room for opportunistic behaviour of the firms' actors increases and other monitoring mechanisms are unavailable (e.g. due to a fragmented ownership), we generally observe a tendency to higher monetary incentives. Additionally, we find that effective board structures (e.g. small boards, professional directors) do not necessarily replace remuneration incentives but also come with a cost that becomes manifest in corresponding compensation levels. For practitioners, our results therefore generally question generic proposals for an optimal compensation structure (e.g. made by compensation consultants) but instead recommend an idiosyncratic model of director compensation that establishes a link to fundamental firm characteristics and the inherent governance structure. We therefore support the approach of German policymakers to formulate the corresponding DCGK passages as recommendations and to not further enforce these provisions as part of the recent amendment to the German Stock Corporation Act. Our results suggest that shareholders strive for good and effective compensation schemes which are "locally optimal" and thus use their discretion responsibly.

In the last years an increasing momentum to understand director compensation as a firm-specific governance instrument to produce effective monitoring structures in the best interest of the company could have been observed. However, given the public call for more professional directors ensuring more effective monitoring, the design of director compensation schemes still offers room for improvements. First, despite the documented recent advancements, total compensation levels even nowadays hardly conform to the delegated responsibility, the workload and the potential risks of litigation.

We argue that the steady catching-up process, that we have depicted in our descriptive results, should continue given the (legislative) objective to recruit qualified and dedicated professionals to serve on supervisory boards. Second, even today performance-based compensation for directors is largely implemented as a short-term incentive rather than a long-term compensation plan (see Andreas et al. 2009 for details). Accordingly, with regard to the discretion of directors (e.g. §§ 90, 111 AktG), it will be crucial in the future to understand the performance contribution of directors as shaping strategic decisions and validating the viability of business models that will only materialize in the long-term and thus adapt the compensation schemes accordingly. In doing so, companies have to carefully select performance criteria that do not undermine the board's ability to make independent judgements, i.e. are robust to potential collusion between directors and the executive management. Thereby, compensation elements which consider the individual monitoring efforts of a director (like committee fees) are reasonable levers which might complement traditional bonuses, since they are unsuspecting to collusion risk.

Finally, given the question of whether the compensation scheme is a symbolic or substantive decision, further research efforts are necessary to back up our conclusion. We see three major starting points to advance the debate. First, it would be fruitful to examine the consequences of distinct director pay schemes, for example the relationship between incentive-pay adoption and CEO turnover (e.g. Perry 1999). This would provide an important litmus test of whether directors' behaviour is affected by the compensation structure as our results suggest. Second, we encourage future research to compare the range of incentives received by directors, i.e. remuneration, retention and reputation (e.g. Yermack 2004). If the compensation scheme is not symbolic, we would expect monetary incentives to be sizeable compared to other incentive mechanisms. Finally, we propose investigating the characteristics of early and late adopters of director incentive pay adoption during the transition of Germany's governance system at the end of the 1990s (e.g. Chizema 2010). Do both adopters generally implement the compensation scheme out of agency considerations or is there a qualitative difference in that late adopters follow more symbolic patterns (Westphal and Zajac 1994)? As part of these future research efforts, further contributions are also encouraged to enhance understanding of the relative importance of more detailed board characteristics. For instance, this study considers as a start the share of professional directors and chairman characteristics as measures for board independence, but particularly the latter has not proven to be of much predictive power. Therefore, exploring alternative proxies may be useful, for example based on the definition provided in DCGK 5.4.2 for which relevant information will be disclosed in annual reports from 2009 onwards.²⁹ Hopefully, a promising area of future research will address these questions.

²⁹ The German Commercial Code (Handelsgesetzbuch – HGB) stipulates in Section §289a that stock companies must disclose an annual declaration of corporate governance which should also elaborate on the independence of board members. This requirement has been part of a recent corporate governance reform in Germany (Act to Modernize Accounting Law (BilMoG)).

References

- Adams R (2003) What do Boards do? Evidence from Board Committee and Director Compensation Data. Working Paper, New York
- Adams R, Hermalin B E, Weisbach M S (2009) The Role of Boards of Directors in Corporate Governance: A Conceptual Framework & Survey. Working Paper, Los Angeles
- Adams R, Ferreira D (2008) Do directors perform for pay? *J Acc Econ* 46:154-171
- Adams R, Ferreira D (2009) Women in the boardroom and their impact on governance and performance. *J Financ Econ* 94:291-309
- Agrawal A, Mandelker G (1987) Managerial incentives and corporate investment and financing decisions. *J Financ* 42:823– 837
- Aguilera V R, Jackson G (2003) The cross-national diversity of corporate governance: Dimensions and determinants. *Acad Manag Rev* 28:447-465
- Anderson M C, Banker R D, Ravindran S (2000) Executive compensation in the information technology industry. *Manag Sci* 46:530-547.
- Andreas J, Rapp M S, Wolff M (2009) Vergütungspraxis in Aufsichtsräten des Prime Standard. *Der Aufsichtsrat* 6(3):34-35
- Arellano M (1987) Computing Robust Standard Errors for Within-Groups Estimators. *Oxf Bull Econ Stat* 49:431–3
- Arellano M (1993) On the testing of correlated effects with panel data. *J Econometrics* 59:87–97.
- Baltagi B (1995) The econometrics of panel data. Wiley, Chichester
- Baltagi B, Bresson G, Pirotte A (2003) Fixed effects, random effects or Hausman Taylor? A pretest estimator. *Econ Lett* 79:361-369
- Barkema H G, Gomez-Mejia (1998) Managerial compensation and firm performance: A general research framework. *Acad Manag J* 41:135-145
- Baums T (2001) Bericht der Regierungskommission Corporate Governance. Otto Schmidt, Köln
- Bäurle I (1996): Krise der Aufsichtsratsstätigkeit: welchen Beitrag leistet die Agency-Theorie? Working Paper, Ingolstadt
- Beatty R P, Zajac E J (1994) Top management incentives, monitoring, and risk sharing: A study of executive compensation, ownership and board structure in initial public offerings. *Adm Sci Q* 39:313-336
- Bebchuk L A, Jesse M F, David I W (2002) Managerial power and rent extraction in the design of executive compensation. *Univ Chicago Law Rev* 69:751-846
- Bebchuk L, Grinstein Y, Peyer U (2007) Lucky directors. Working Paper, Cambridge
- Becher D A, Campbell T L, Frye M B (2005) Incentive compensation for Bank Directors: The impact of De-regulation. *J Bus* 78:1753-1777
- Beiner S, Schmid M M, Wanzenried G (2009) Product Market Competition, Managerial Incentives and Firm Valuation. *Eur Financ Manag*. doi: 10.1111/j.1468-036X.2009.00505.x
- Berle AA, Means GC (1932) The modern corporation and private property. Harcourt, Brace and World, New York
- Bertrand M, Mullainathan S (2003) Enjoying the Quit Life? Corporate Governance and Managerial Preferences. *J Polit Econ* 111:1043-1075

- Black B, Bhagat S (2002) The Non-Correlation Between Board Independence and Long-Term Firm Performance. *J Corp Law* 27:231-74
- Böcking H J (2004) Prüfungsausschuss und Aufsichtsratsvergütung - Elemente einer verantwortungsvollen Corporate Governance. In: Lange T A, Löw E (ed) *Rechnungslegung, Steuerung und Aufsicht von Banken: Kapitalmarktorientierung und Internationalisierung*. Gabler, Wiesbaden, pp 564-588
- Börsch-Supan A, Köke J (2002) An applied econometricians' view of empirical corporate governance studies. *Ger Econ Rev* 3:295-326
- Boyd B K (1996) Determinants of US Outside Director Compensation. *Corp Gov* 4:202-211
- Brandes P, Hadani M, Goranova M (2006) Stock options expensing: An examination of agency and institutional theory explanations. *J Bus Res* 59:595-603
- Breusch T S, Pagan A R (1980) The lagrange multiplier test and its applications to model specification in econometrics. *Rev Econ Stud* 47:239-53
- Bresser R K, Thiele R V (2008) Ehemalige Vorstandsvorsitzende als Aufsichtsratschefs: Evidenz zu ihrer Effektivität im Falle des erzwungenen Führungswechsels. *ZfB* 78: 175-203
- Brick I E, Palmon O, Wald J K (2006) CEO compensation, director compensation, and firm performance: Evidence or cronyism? *J Corp Financ* 12:403-423
- Bruce A, Buck T, Main B G (2005) Top Executive Remuneration: A View from Europe. *J Manag Stud* 42:1493-1506
- Bryan S, Nash R, Patel A (2006) Can the agency costs of debt and equity explain the changes in executive compensation during the 1990s? *J Corp Financ* 12:516-535
- Bryan S, Hwang L S, Klein A (2000) Compensation of Outside Directors: An Empirical Analysis of Economic Determinants. Working Paper, New York
- Bryan S, Klein A (2004) Non-Management Director Options, Board Characteristics, and Future Firm Investments and Performance. Working Paper, New York
- Cameron A C, Trivedi P (2005) *Microeconometrics: methods and applications*. Cambridge University Press, New York
- Carpenter M A, Westphal J D (2001) The strategic context of external network ties: Examining the impact of director appointments on board involvement in strategic decision making. *Acad Manag J* 44:639-660
- Chatterjee S, Price B (1977) *Regression analysis by example*. Wiley, New York
- Chizema A (2008) Institutions and voluntary compliance: The disclosure of individual executive pay in Germany. *Corp Gov* 16:359-374
- Chizema A (2010) Early and late adoption of American-style executive pay in Germany: Governance and Institutions. *J World Bus* 45:9-18
- Chizema A, Buck T (2006) Neo-institutional theory and institutional change: Towards the 'Americanization' of German executive pay practice. *Int Bus Rev* 15:488-504
- Canyon M J, Peck S I, Sadler G V (2001) Corporate Tournaments and Executive Compensation: Evidence for the UK. *Strateg Manag J* 22:805-815
- Canyon M J, Schwalbach J (2000) Executive Compensation: Evidence from the UK and Germany. *LRP* 33:504-526
- Cordeiro J, Veliyath R, Erasmus E J (2000) An empirical investigation of the determinants of outside director compensation. *Corp Gov* 8:268-279

- Core J, Holthausen R, Larcker D (1999) Corporate governance, chief executive officer compensation, and firm performance. *J Financ Econ* 51:371-406
- Cronqvist H, Fahlenbrach R (2009) Large shareholders and corporate policies. *Rev Financ Stud* 22:3941-3976
- Daily C M, Dalton D R, Rajagopalan N (2003) Governance through ownership: centuries of practice, decades of research. *Acad Manag J* 46:151-158
- Davidson R, MacKinnon J (1993) *Estimation and Inference in Econometrics*. Oxf Univ Press, New York
- Davis J H, Schoorman F D, Donaldson L (1997) Toward a Stewardship Theory of Management. *Acad Manag Rev* 22:20-47
- Deutsch Y (2007): The Influence of Outside Directors' Stock Compensation on Firms R&D. *Corp Gov* 15:816-827
- DiMaggio P J, Powell W W (1983) The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *Am Sociol Rev* 48:147-160
- Dittmann I, Maug E (2007) Lower salaries and no options? On the optimal structure of executive pay. *J Financ* 62:303-343
- Dittmann I, Maug E, Schneider C (2009) Bankers on the boards of German firms: What they do, what they are worth, and why they are (still) there. *Rev Financ*. doi: 10.1093/rof/rfp007.
- Donaldson L, Davis J H (1991) Stewardship Theory or Agency Theory: CEO Governance and Shareholder Returns. *Austral J Manag* 16:49-64
- Donaldson L, Davis J H (1994) Boards and Firm Performance - Research Challenges the Conventional Wisdom. *Corp Gov* 2: 151-160
- Edwards J S, Eggert W, Weichenrieder A J (2009) Corporate governance and pay for performance: evidence from Germany. *Econ Gov* 10:1-26
- Eisenberg T, Sundgren S, Wells M (1998) Larger board size and decreasing firm value in small firms. *J Financ Econ* 48:35-54
- Elsas R, Florysiak D (2008) Empirical capital structure research: New ideas, recent evidence, and methodological issues. Working Paper, Munich
- Elston J A, Goldberg L G (2003) Executive compensation and agency costs in Germany. *J Bank Financ* 27:1391-1410
- Engeser M (2009) Blick nach vorn: Welche Herausforderungen 2010 auf Top-Manager warten. *Wirtschaftswoche* No. 52: 92-96
- Engel E, Hayes R M, Wang X (2010) Audit Committee Compensation and the Demand for Monitoring of the Financial Reporting Process. *J Acc Econ* 49:136-154
- Ertugrul M, Hegde S (2008) Board compensation practices and agency cost of debt. *J Corp Financ* 14:512-531.
- Fockenbrock D (2009) Im Geflecht der Kontrolleure. *Handelsblatt* 4 Nov 2009:32-33
- Fahlenbrach R (2009) Shareholder rights, boards, and CEO compensation. *Rev Financ* 13:81-113
- Fallgatter M J (2003) Variable Vergütung von Mitgliedern des Aufsichtsrates: Resultiert eine verbesserte Unternehmensüberwachung? *DBW* 63:703-713
- Fallgatter M J, Simons D (2003) Zum Überwachungsgefüge deutscher Kapitalgesellschaften - Eine anreiztheoretische Analyse der Vergütung, Haftung und Selbstverpflichtung des Aufsichtsrates. Working Paper, Bielefeld
- Fama E F (1980) Agency problems and the theory of the firm. *J Polit Econ* 88:288-307

- Fama E F, French K R (1997) Industry costs of equity. *J Financ Econ* 43:153-193
- Fama E F, Jensen M C (1983) Separation of Ownership and Control. *J Law Econ* 26:301-25
- Farrell K A, Friesen G C, Hersch P L (2008) How do firms adjust director compensation. *J Corp Financ* 14:153-162
- Ferrarini G, Moloney N, Ungureanu M C (2009) Understanding directors' pay in Europe: An comparative and empirical analysis. Working Paper, Brussels
- Ferris S P, Jagannathan M, Pritchard A C (2003) Too busy to mind the business? Monitoring by directors with multiple board appointments. *J Financ* 59:1087-1111
- Fich E M, Shivdasani A (2005) The Impact of Stock Option Compensation for Outside Directors on Firm Value. *J Bus* 78:2229-2254
- Fich E M, Shivdasani A (2006): Are Busy Boards Effective Monitors? *J Financ* 61:689-724
- Gillette A B, Noe T H, Rebello M J (2003) Corporate board composition, protocols, and voting behavior: experimental evidence. *J Financ* 58:1997-2032
- Gilson R J (2001) Globalizing corporate governance: Convergence of form or function. *Am J Comp Law* 49:329-357
- Giroud X, Mueller H M (2010) Does corporate governance matter in competitive industries? *J Financ Econ* 95:312-331
- Goergen M, Manjon M C, Renneboog L (2008) Is the German system of corporate governance converging towards the Anglo-American model? *J Manage Gov* 12:37-71
- Granovetter M (1985) Economic action and social structure: The problem of embeddedness. *Am J Sociol* 19:481-510
- Greene W H (2003) *Econometric analysis*. 5th edn. Prentice Hall, Upper Saddle River
- Grosfeld I, Tresselt T (2002) Competition and ownership structure: Substitutes or complements? *Econ Transit* 10:525-551
- Grossman S J, Hart O D (1982) Corporate financial structure and managerial incentives. In: McCall J J (ed) *The economics of information and uncertainty*. University of Chicago Press, Chicago, pp 123-155
- Grossman S J, Hart O D (1983) An analysis of the principal-agent problem. *Econometrica* 51:7-45
- Habersack M (2004) Die erfolgsabhängige Vergütung des Aufsichtsrats und ihre Grenzen. *ZGR* 33:721-734
- Harris M, Raviv A (2008) A theory of board control and size. *Rev Financ Stud* 21:1797-1832
- Hartmann K (2003) Die Aufsichtsratsvergütung als Erfolgsfaktor im deutschen Corporate-Governance-System. Dissertation, Otto-von-Guerike University Magdeburg
- Hartzell J C, Starks L T (2003) Institutional investors and executive compensation. *J Financ* 58:2351-2374.
- Hausman J A (1978) Specification tests in econometrics. *Econometrica* 46:1251-1271
- Heide J B (1994) Interorganizational governance in marketing channels. *J Marketing* 58:71-85
- Heinze T (2004) Dynamics in the German system of corporate governance? Empirical findings regarding interlocking directorates. *Econ Soc* 33:218-238
- Hempel P, Fay C (1994) Outside director compensation and firm performance. *Hum Resour Manag* 33:111-133
- Hermalin B E, Weisbach M S (1998) Endogenously chosen boards of directors and their monitoring of the CEO. *Am Econ Rev* 88:96-118
- Heugens P P, Lander M W (2009) Structure! Agency! (and other quarrels): A meta-analysis of institutional theories of organization. *Acad Manag J* 52:61-85

- Hillman A J, Nicholson G, Shropshire (2008) Directors' Multiple Identities, Identification, and Board Monitoring and Resource Provision. *Organ Sci* 19:441-456
- Himmelberg C P, Hubbard R G, Palia D (1999) Understanding the determinants of managerial ownership and performance. *J Financ Econ* 53:333-384
- Hoetker G (2007) The use of logit and probit models in strategic management research: critical issues. *Strateg Manag J* 28: 331-343
- Holderness C G (2003) A survey of blockholders and corporate control. *FRBNY Econ Policy Rev* 9: 51-64
- Hung H (1998) A typology of the theories of the roles of governing boards. *Corp Gov* 6:101-111
- Januszewski S I, Köke J, Winter J K (2002) Product market competition, corporate governance and firm performance: an empirical analysis for Germany. *Res Econ* 56:299-332
- Jensen M C (1986) Agency costs of free cash flow, corporate finance and takeovers. *Am Econ Rev* 76:323-329
- Jensen M C (1993) The modern industrial revolution, exit, and the failure of internal control systems. *J Financ* 48:831-880
- Jensen M C, Meckling W H (1976) Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure. *J Financ Econ* 3:305-360
- Jensen M C, Murphy K J (1990) Performance pay and top-management incentives. *J Polit Econ* 98:225-264
- Jensen M C, Murphy K J (2004) Renumeration: Where we've been, how we got there, what are the problems, and how to fix them. Working Paper, Brussels
- Jensen M C, Zajac E J (2004) Corporate elites and corporate strategy: How demographic preferences and structural position shape the scope of the firm. *Strateg Manag J* 25:507-524
- Judge W Q, Zeithaml C P (1992) Institutional and strategic choice perspectives on board involvement in the strategic decision process. *Acad Manag J* 35:766-794
- Jungmann C (2006) The Effectiveness of Corporate Governance in One-Tier and Two-Tier Board Systems – Evidence from the UK and Germany. *Eur Co Financ Law Rev* 3:426-474
- Kaserer C, Wagner N (2004) Determinanten der Vorstandsvergütung in Deutschland: Paradigmenwechsel oder Versagen der Unternehmenskontrolle. Working Paper, Munich
- Knoll L, Knoesel J, Probst U (1997) Aufsichtsratsvergütungen in Deutschland: Empirische Befunde. *zfbf* 49:236-254
- Kren L, Kerr J L (1997) The Effects of Outside Directors and Board Shareholdings on the Relation Between Chief Executive Compensation and Firm Performance. *Account and Bus Res* 27:297-309
- Kumar P, Sivaramakrishnan K (2008) Who Monitors the Monitor? The Effect of Board Independence on Executive Compensation and Firm Value. *Rev Financ Stud*. doi: 10.1093/rfs/hhn010
- Lesaffre E, Spiessens B (2001) On the effect of the number of quadrature points in a logistic random-effects model: An example. *J R Stat Soc* 50:325-335
- Linck J S, Netter J M, Yang T (2008) The determinants of board structure. *J Financ Econ* 87:308-328
- Linn S C, Park D (2005) Outside director compensation policy and the investment opportunity set. *J Corp Financ* 11:680-715
- Lipton M, Lorsch J (1992) A modest proposal for improved corporate governance. *Bus Lawyer* 48:59-77
- Long J S, Freese J (2006) Regression models for categorical and limited dependent variables using Stata. 2nd edn. Stata Press, College Station

- Lutter M (2001) Der Aufsichtsrat: Kontrolleur oder Mit-Unternehmer? In: Sadowski D (ed) *Entrepreneurial Spirits*. Gabler, Wiesbaden, pp 225-235
- Martens K (2000) Managementüberwachung durch den Aufsichtsrat: Ein Beitrag zur Corporate Governance-Diskussion aus agencytheoretischer Sicht. Dissertation, University of Cologne.
- Maug E (1997) Boards of directors and capital structure. *J Corp Financ* 3:113–139
- Minnick K, Zhao M (2009) Backdating and Director Incentives: Money or Reputation? *J Financ Res* 32:449-477.
- Moerland P (1995) Alternative disciplinary mechanisms in different corporate systems. *J Econ Behav Organ* 26:17-34
- Morck R, Shleifer A, Vishny R (1988) Management ownership and market valuation: An empirical analysis. *J Financ Econ* 20:293-315
- Mundlak Y (1978) On the pooling of time series and cross sectional data. *Econometrica* 56:69-86
- Murphy K (1985) Corporate performance and managerial remuneration: An empirical analysis. *J Acc Econ*, 7:11-42
- Nickell S J (1996) Competition and Corporate Performance. *J Polit Econ* 104:724-746
- Nowak E (2001) Recent Developments in German Capital Markets and Corporate Governance. *J Appl Corp Financ* 14:35-48
- Nowak E, Mahr T, Rott R (2005) Wer den Kodex nicht einhält, den bestraft der Kapitalmarkt? Eine empirische Analyse der Selbstregulierung und Kapitalmarktrelevanz des Deutschen Corporate Governance Kodex. *ZGR* 34:252-279
- Oehmichen J, Rapp M S, Wolff M (2009) Busy boards in a two-tier system: old-boys network or efficient monitoring technology. *Eur Econ Assoc Annual Meeting 2009 Paper*
- O'Reilly III C A, Main B G, Crystal G S (1988) CEO Compensation as Tournament and Social Comparison: A Tale of Two Theories. *Adm Sci Q* 33:257-274
- Ornstein M (1984) Interlocking directorates in Canada: Intercompany or class alliance? *Adm Sci Q* 29:210-231
- Perry T (1999) Incentive Compensation for Outside Directors and CEO Turnover. Working Paper, Tempe
- Petersen M A (2008) Estimating standard errors in finance panel data sets: Comparing approaches. *Rev Financ Stud* 22:435-480
- Pfeffer J (1972) Size and composition of corporate boards of directors: The organization and its environment. *Adm Sci Q* 17:218-228
- Pfeffer J, Salancik G R (1978) *The External Control of Organizations: A Resource Dependence Perspective*. Harper and Row, New York
- Prange S (2009) Aufsichtsrat Ahnungslos. *Handelsblatt* 10 Jul 2009:19
- Pugliese A, Bezemer P J, Zattoni A et al. (2009) Boards of directors' contribution to strategy: A literature review and research agenda. *Corp Gov* 17:292-306
- Rabe-Hesketh S, Skrondal A (2008) *Multilevel and longitudinal modeling using stata*. 2nd edn. Stata Press, College Station
- Rabe-Hesketh S, Skrondal A, Pickles A (2005) Maximum likelihood estimation of limited and discrete dependent variable models with nested random effects. *J Econometrics* 128:301-323
- Rapp M S, Wolff M (2010) Determinanten der Vorstandsvergütung – eine empirische Untersuchung der deutschen Prime Standard Unternehmen. *ZfB (forthcoming)*

- Ruiz-Verdú P (2008) Corporate Governance When Managers Set Their Own Pay. *Eur Financ Manag* 14:921-943
- Ryan H E, Wiggins R A (2004) Who is in whose pockets? Director compensation, board independence, and barriers to effective monitoring. *J Financ Econ* 74:497-524
- Schmid F A (1997) Vorstandsbezüge, Aufsichtsratsvergütung und Aktionärsstruktur. *ZfB* 67:67-83
- Schmidt K M (1997) Managerial Incentives and Product Market Competition. *Rev Econ Stud* 64:191-213
- Schmidt R, Schwalbach J (2007) Zu Höhe und Dynamik der Vorstandsvergütung in Deutschland. *ZfB Special Issue I/2007*:111-122
- Schöndube-Pirchegger B, Schöndube J R (2010) On the Appropriateness of Performance-Based Compensation for Supervisory Board Members - An Agency Theoretic Approach. *Eur Acc Rev*. doi: 10.1080/09638180903487784
- Schwalbach J (2004) Effizienz des Aufsichtsrats. *Die Aktiengesellschaft* 4:186-190
- Scott W R (2003) *Organizations: Rational, Natural and Open Systems*. 5th edn. Prentice Hall, Upper Saddle River
- Seyboth M (2003) Angemessene Vorstands- und Aufsichtsratsvergütungen. In: Deutscher Gewerkschaftsbund (ed) *Themenheft Mitbestimmung und Rechtspolitik*. DGB, Berlin, pp 6-26
- Shivdasani A, Yermack D (1999) CEO involvement in the selection of new board members: an empirical analysis. *J Financ* 55:1829-853
- Shleifer A, Vishny R W (1997) A survey of corporate governance. *J Financ* 52:737-783
- Siegel T (2003) Kriterien der Vergütung des Aufsichtsrats. In: von Werder A, Wiedmann K (ed) *Internationalisierung der Rechnungslegung und Corporate Governance: Festschrift für Prof. Dr. Klaus Pohle*. Schäffer-Poeschel, Stuttgart, pp 405-418
- Smith C, Watts R (1992) The investment opportunity set and corporate financing, dividend, and compensation policies. *J Financ Econ* 32:263-292
- Speidel E, Ward M, Surdel R (2009) Board of Director Pay: Compensation Trends in the High-Technology and Life Sciences Industries. *Compens Benefit Rev* 41:52-60
- Stulz R (1990) Managerial discretion and optimal financing policies. *J Financ Econ* 26:3-28
- Theisen M R (1998) Empirical evidence and economic comments on board structure in Germany. In: Hopt K J, Kanda H, Roe M J, Wymeersch E, Prigge S (ed) *Comparative Corporate Governance*. Oxford University Press, Oxford, pp 259-266
- Theisen M R (2003a) Herausforderung Corporate Governance. *DBW* 63:441-464
- Theisen M R (2003b) Aufsichtsrat/Board: Aufgaben, Besetzung, Organisation, Entscheidungsfindung und Willensbildung – Betriebswirtschaftliche Ausfüllung. In: Hommelhoff P, Hopt K J, von Werder A (ed) *Handbuch Corporate Governance*. Schäffer-Poeschel, Stuttgart, pp 285-304
- Tirole J (1986) Hierarchies and Bureaucracies: On the Role of Collusion in Organizations. *J Law Econ Organ* 2:181-214
- Vafeas N (1999) Determinants of the adoption of director incentive plans. *J Acc Audit Financ* 14:453-474
- Velte P (2009) Stewardship-Theorie. *ZP*. doi: 10.1007/s00187-009-0078-3
- von Werder A, Talaulicar T (2008) Kodex Report 2008: Die Akzeptanz der Empfehlungen und Anregungen des Deutschen Corporate Governance Kodex. *Der Betrieb* 61:825-831
- Webster J, Watson R T (2002) Analyzing the past to prepare for the future: writing a literature review. *MIS Q* 26:xiii-xxiii

- Westphal J, Zajac E J (1994) Substance and symbolism in CEOs' long-term incentive plans. *Adm Sci Q* 39:367-390
- Wiersema M F, Bowen H P (2009) The use of limited dependent variable techniques in strategy research: issues and methods. *Strateg Manag J* 30: 679-692
- Williamson O E (1984) Corporate governance. *Yale Law J* 93:1197-1230
- Wooldridge J M (2002) *Econometric Analysis of Cross Section and Panel Data*. MIT Press, Cambridge
- Yermack D (1995) Do corporations award CEO stock options effectively? *J Financ Econ* 39:237-269
- Yermack D (2004) Remuneration, Retention, and Reputation Incentives for Outside Directors. *J Financ* 59:2281-2308
- Zajac E J, Westphal J D (1994) The costs and benefits of managerial incentives and monitoring in large US corporations: when is more not better? *Strateg Manag J* 15:121-142
- Zelner B A (2009) Using simulation to interpret results from logit, probit, and other nonlinear models. *Strateg Manag J*. doi: 10.1002/smj783
- Zhou X (2001) Understanding the determinants of managerial ownership and the link between ownership and performance: Comment. *J Financ Econ* 62:559-571

Appendix

Table 1: Summary of Studies on the Determinants of Director Compensation

Author	Country	Year	Time Period	Obs.	Method	Results of Explanatory Variables																			
						Firm Characteristics							Corporate Performance		Corporate Governance: Ownership Structure			Corporate Governance: Board Characteristics							
						Size	Leve- rage	Free CF	In- vest. Opp.	Growth	Risk	Diver- sifica- tion	Capital market ¹	Accoun- ting ²	Share- holder conc.	Board/ Mgt. Owner.	Share- holder structure	Co- deter- minat.	Board Size	Mee- tings	Oth. Dir.- ships	Inde- pend- ence	CEO Dual.	CEO/ Direct Charact.	
Panel A – Determinants of Total Director Compensation																									
Hempel et al.	US	1994	1986+90	469	OLS	o								o					+	+	*				
Boyd	US	1996	1980+87	642	LISREL	+	*							o		–	*					+	*		
Schmid	GER	1997	1991	120	SUR	+	*							+	*	–	*		–*3/+*4/+5	+					
Knoll et al.	GER	1997	1989-93	125	OLS								+												
Cordeiro et al.	US	2000	1995	200	OLS	+				+	*		–				–		+6/+7			–			
Elston et al.	GER	2003	1970-86	1,365	FE, GMM	+	*							+		–	*		–*4/–*5/ –*8/–*9						
Ryan et al.	US	2004	1997	1,018	OLS	+	*		+	*			+	–	*				–	*		+	o	–*10/+*11	
Yermack	US	2004	1994-96	1,636	OLS					–	*			+	*										
Linn et al.	US	2005	1996-01	901	OLS	+	*		+	*															
Brick et al.	US	2006	1992-01	5,923	OLS, FE	+	*	–		o		+		+	*	+		–			+	*	+	o10/+*12 /–13	
Farrell et al.	US	2008	1998-04	1,635	OLS	+	*	o		+	*				o										
Adams et al.	US	2009	1996-03	8,253	OLS, FE	+	*		+	*		o	–		+				–			+		o14	
Panel B – Determinants of Performance-based/Incentive Pay																									
Vafeas	US	1999	1989-95	201	Logit	–			–					–			–	–7		–		+	*	+	
Ryan et al.	US	2004	1997	1,018	Probit, Tobit	+	*		+					o	–					–			+	–*10/+*11	
Becher et al.	US	2005	1992-99	12,760	GLS	o	–	*		o		o													
Fich et al.	US	2005	1997-99	2,088	Probit	–			+	*				o			–	*	+	*6		+		–11/–*16 /+17	
Ertugrul et al.	US	2008	2000-02	716	Tobit	+	*	–	+	+	*	o			+		–	*	+	6		+	*	+	
Minnick et al.	US	2009	1996-05	14,010	OLS	+	*							+	*					–	*		+	+	–*18/–19

This table shows the main findings of previous studies that examine the determinants of director compensation levels and structure. (*) denotes statistical significance at the 10% level or better. The signs (+) and (–) report positive or negative directions of respective coefficients; inconclusive results in repeated regressions or robustness tests within the study are denoted by (o). The inclusion of industry and period dummies is not reported separately. (1) e.g. Total shareholder return, market capitalization (2) e.g. Return on Assets, Earnings per Share (3) State (4) Banks (5) Family (6) Institutional investors (7) External blockholder (8) Foreign blockholder (9) Industrial blockholder (10) CEO tenure (11) CEO of founding family (12) CEO gender (female) (13) Internal CEO (14) Proportion of female directors (15) Directors who are CEOs of other companies (16) CEO age (17) New CEO indicator (18) Tenure of outside directors (19) Chair of the board is external director

Figure 1: Research Model

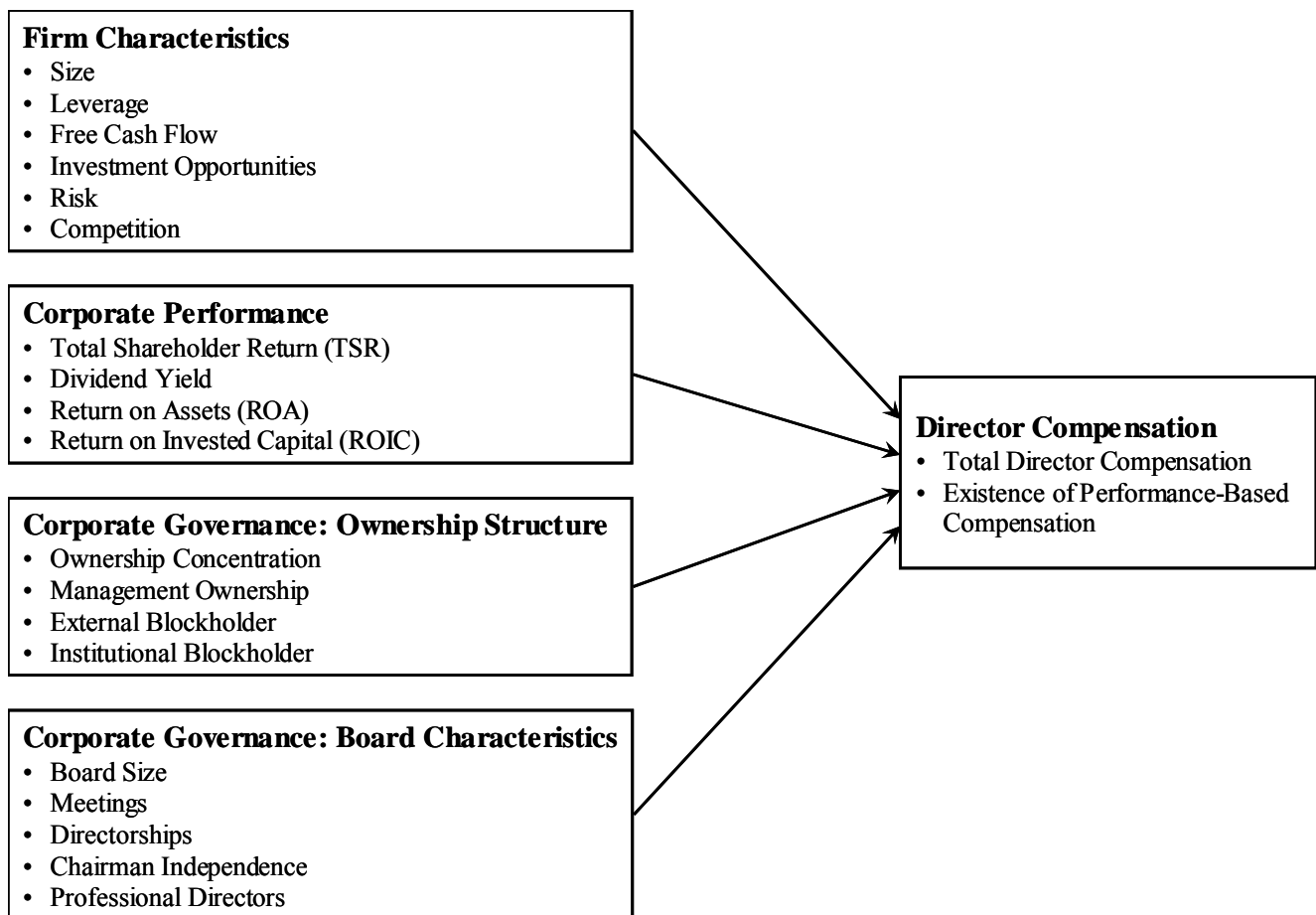


Table 2: Descriptive Statistics on Board of Director Compensation

Variable	2005	2006	2007	2008	Average 2005–2008
<i>Panel A – Level of Board of Director Compensation</i>					
Total Compensation					
Mean	32,152	37,101	39,284	42,319	37,838
Median	20,000	20,938	24,583	27,000	24,000
St.Dev.	31,860	43,805	40,073	44,057	40,484
Min	1,000	2,000	2,300	3,000	1,000
Max	187,954	431,111	309,000	302,778	431,111
Obs	278	292	309	301	1,180
Non Performance-based Compensation					
Mean	20,986	22,779	25,815	28,874	24,772
Median	16,329	17,750	19,017	21,950	18,363
St.Dev.	16,233	17,541	24,264	26,969	22,122
Min	1,000	3,833	2,300	3,000	1,000
Max	107,167	124,863	222,222	222,222	222,222
Obs	235	255	270	272	1,032
Performance-based Compensation					
Mean	12,218	15,571	15,002	14,366	14,341
Median	0.000	0.000	0.000	0.000	0.000
St.Dev.	24,378	35,794	29,076	29,864	30,117
Min	0.000	0.000	0.000	0.000	0.000
Max	145,000	342,222	198,449	215,083	342,222
Obs	235	255	270	272	1,032
Share of Performance-based Compensation					
Mean	0.194	0.207	0.209	0.189	0.200
Median	0.000	0.000	0.000	0.000	0.000
St.Dev.	0.276	0.279	0.279	0.267	0.275
Min	0.000	0.000	0.000	0.000	0.000
Max	0.960	0.954	0.945	0.940	0.960
Obs	235	255	270	271	1,031
<i>Panel B – Structure of Board of Director Compensation</i>					
Percentage of Firms Granting Performance-Based Compensation					
Mean	0.593	0.614	0.618	0.622	0.612
St.Dev.	0.492	0.487	0.486	0.485	0.487
Obs	266	285	304	297	1,152
Percentage of Firms Granting Meeting Fees					
Max	0.290	0.318	0.353	0.375	0.335
Obs	0.454	0.466	0.478	0.485	0.472
Max	262	283	303	298	1,146
Percentage of Firms Granting Committee Fees					
Max	0.375	0.401	0.424	0.442	0.412
Obs	0.485	0.491	0.495	0.497	0.492
Max	266	284	304	298	1,152

Table 2 reports summary statistics on director compensation for all companies in the revised sample. All compensation numbers in Panel A are measured in euros. The share of performance-based compensation is expressed as a percentage of the total compensation package. Total compensation equals the sum of all fixed and variable pay disclosed in the firm's annual report. Performance-based compensation is the sum of all variable (short- and long-term) pay components that are tied to the financial performance of the firm (e.g., EBIT or Return on Assets figures). Non-performance-based compensation equals the annual fee and other fixed pay components such as fixed fees per meeting or committee membership.

Table 3: Variable Definitions and Sources

Variable	Description	Source
<i>A – Firm Characteristics</i>		
Size	Measure of firm size (natural logarithm of total assets)	Worldscope
Leverage	Leverage metric (total debt / total capital)	Worldscope
Free Cash Flow	Free cash flow proxy (Net operating cash flow - cash dividends - capital expenditures)	Worldscope
Investment Opportunities	Market-to-book multiple of the firm's equity	Worldscope
Risk	Volatility of the previous 36 monthly stock returns	Datastream
Competition	Industry competition measured as inverse of the median industry rent on the basis of the 12-industry portfolio by Fama and French 1997	Datastream
<i>B – Corporate Performance</i>		
TSR	Annual total shareholder return, defined as the sum of capital gains plus dividends	Datastream
Dividend Yield	Dividend yield (dividends per share / year end stock price * 100)	Datastream
ROA	Return on Assets	Datastream
ROIC	Return on Invested Capital	Datastream
<i>C – Corporate Governance: Ownership Structure</i>		
Ownership concentration	Herfindahl index of voting rights held by blockholders of the firm	Hoppenstedt Aktienführer, Annual Reports
Management Ownership	Voting rights held by the executive management	Hoppenstedt Aktienführer, Annual Reports
External Blockholder	Voting-power weighted dummy variable measuring the relative share of external shareholders if the voting share exceeds 10%	Hoppenstedt Aktienführer, Annual Reports
Institutional	Voting-power weighted dummy variable measuring the relative share of institutional investors if the voting share exceeds 10%	Hoppenstedt Aktienführer, Annual Reports
<i>D – Corporate Governance: Board Characteristics</i>		
Board Size	Number of directors (incl. employee representatives in the case that the firm acts under codetermination)	Hoppenstedt Aktienführer, Annual Reports
Directorships (0,1)	Dummy variable which equals 1 in the case that at least 50% of directors (excl. employee representatives) have three (or more) additional directorships	Annual Reports, IR requests
Effort	Number of board meetings per year	Hoppenstedt Aktienführer, Annual Reports
Chairman Independence	Indicator variable that equals 0 (1, 2, 3) whenever the current chairman is a founder of the firm (a former firm executive, a non-affiliated director with industry experience, a non-affiliated director without industry experience)	Annual Reports, IR requests
Professional Directors	Proportion of board members (excl. employee representatives) who are full-time directors	Annual Reports, IR requests

Table 4: Descriptive Summary Statistics

Variable	Mean	St.Dev.	25 th Percentile	Median	75 th Percentile	VIF
Total Director Compensation	3.299	0.865	2.686	3.199	3.825	-
Performance-based pay (0,1)	0.639	0.481	0.000	0.000	1.000	-
<i>A – Firm Characteristics</i>						
Size	5.861	2.244	4.122	5.381	7.194	4.09
Leverage	0.195	0.199	0.038	0.163	0.297	1.11
Free Cash Flow	-3.338	1,151.1	-4.596	2.052	16.270	1.01
Investment Opportunities	2.222	2.770	1.193	1.762	2.704	1.18
Risk	0.114	0.051	0.079	0.104	0.136	1.61
Competition	19.470	11.747	9.614	20.425	24.611	1.21
<i>B – Corporate Performance</i>						
TSR	9.912	50.644	-24.231	6.405	35.509	1.76
Dividend Yield	2.020	3.408	0.000	1.366	3.094	1.14
ROA	4.891	8.926	2.599	5.683	8.945	1.35
ROIC	7.923	14.868	3.888	8.761	13.974	1.29
<i>C – Corporate Governance: Ownership Structure</i>						
Ownership Concentration	0.183	0.200	0.034	0.106	0.278	1.06
Management Ownership	0.129	0.217	0.000	0.000	0.197	1.45
External Blockholder	0.284	0.296	0.000	0.249	0.529	1.39
Institutional	0.081	0.169	0.000	0.000	0.102	1.07
<i>D – Corporate Governance: Board Characteristics</i>						
Board Size	7.946	5.510	3.000	6.000	12.00	3.62
Meetings	5.564	2.159	4.000	5.000	6.00	1.10
Directorships (0,1)	0.296	0.457	0.000	0.000	1.00	1.23
Chairman Independence	3.198	1.021	3.000	4.000	4.00	1.09
Professional Directors	0.202	0.227	0.000	0.167	0.33	1.30

Table 4 presents descriptive statistics for firm, performance and governance characteristics variables over the period 2005–2008 for our sample of 928 firm-year observations. The values of total director compensation and firm size reflect the logarithmic transformation. We report the mean, its standard deviation, the values for the median and the 25th and 75th percentiles. The VIF column lists the maximum variance inflation factors observed for the variables across the different regression models. Variable definitions are provided in Table 3.

Table 5: Determinants of Director Total Compensation

Dependent Variable Model	Natural Logarithm of Total Compensation per Director						
	A1	B1	B2	B3	C1	C2	D1
<i>A – Firm Characteristics</i>							
Size	0.2611*** (14.66)	0.2569*** (14.88)	0.2576*** (15.32)	0.2559*** (14.82)	0.2554*** (15.07)	0.2504*** (14.57)	0.3199*** (10.99)
Capital Structure							
<i>Leverage</i>	-0.3238* (-1.87)	-0.2406* (1.65)	-0.2740** (-2.33)	-0.2299 (-1.60)	-0.2219 (-1.62)	-0.2281* (-1.68)	-0.2382 (-1.46)
<i>Free Cash Flow</i>	2.76E-05** (2.48)	2.65E-05** (2.47)	2.58E-05** (2.49)	2.67E-05** (2.51)	2.67E-05** (2.61)	2.67E-05** (2.54)	2.73E-05*** (2.99)
Investment Opportunities	0.0003 (0.10)	-0.0004 (-0.11)	-0.0013 (-0.40)	-0.0001 (-0.03)	-0.0001 (-0.02)	-0.0002 (-0.05)	0.0004 (0.12)
Risk	0.530 (1.24)	0.6460 (1.57)	0.7031* (1.73)	0.6954* (1.72)	0.6521 (1.62)	0.6850* (1.69)	0.5044 (1.30)
Competition	0.0006 (0.47)	0.0003 (0.19)	0.0001 (0.08)	0.0002 (0.11)	0.0001 (0.08)	1.28E-06 (0.01)	0.0005 (0.38)
<i>B – Corporate Performance</i>							
Capital Market Performance							
<i>TSR</i>	–	-0.0004 (-1.34)	–	-0.0004 (-1.19)	-0.0003 (-1.08)	-0.0003 (-1.03)	-0.0003 (-0.94)
<i>Dividend Yield</i>	–	–	0.0081** (2.10)	0.0075** (1.99)	0.0079** (2.08)	0.0078** (2.10)	0.0076* (1.80)
Accounting/Operative Performance							
<i>ROA</i>	–	0.0079*** (3.78)	–	0.0076*** (3.62)	0.0079*** (3.82)	0.0077*** (3.66)	0.0083*** (4.03)
<i>ROIC</i>	–	–	0.0043*** (3.35)	–	–	–	–
<i>C – Corporate Governance: Ownership Structure</i>							
Ownership Concentration	–	–	–	–	-0.3407** (-2.18)	–	-0.3294** (-2.18)
Management Ownership	–	–	–	–	–	-0.4079*** (-3.21)	–
External Blockholder	–	–	–	–	–	-0.2235** (-2.47)	–
Institutional	–	–	–	–	–	-0.0108 (-0.09)	–
<i>D – Corporate Governance: Board Characteristics</i>							
Board Size	–	–	–	–	–	–	-0.0393*** (-3.38)
Meetings	–	–	–	–	–	–	0.0185** (2.45)
Directorships (0,1)	–	–	–	–	–	–	-0.0187 (-0.65)
Chairman Independence	–	–	–	–	–	–	0.0279 (0.79)
Professional Directors	–	–	–	–	–	–	0.2839*** (3.28)
RE Cross-Section (Breusch-Pagan)	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.485	0.490	0.492	0.491	0.494	0.500	0.512
Model Chi ²	298.41***	333.52***	340.11***	339.78***	359.03***	365.86***	409.61***

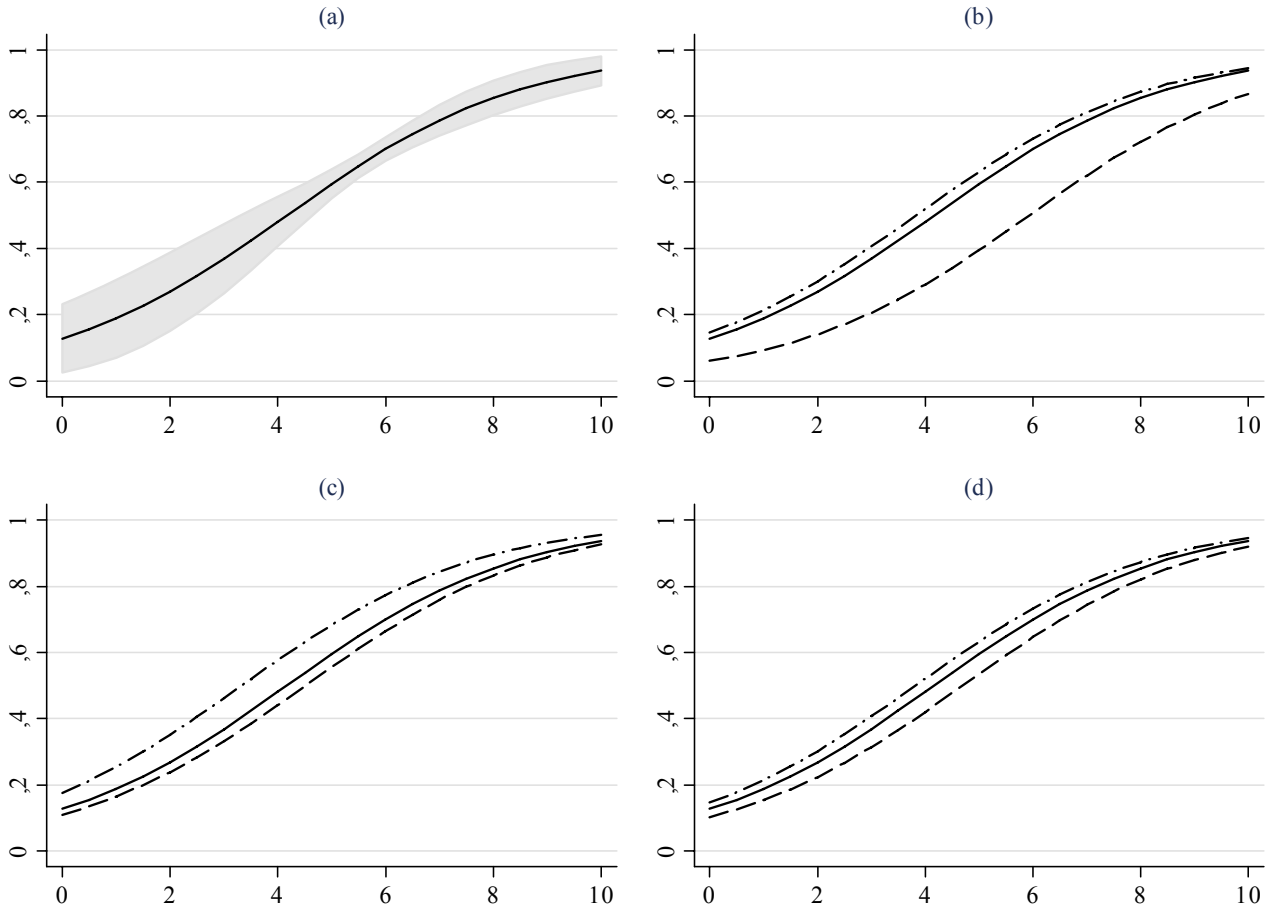
This table presents our analysis of the determinants of director total compensation. In all models we control for unobservable heterogeneity by using random firm effects and year dummies. We present t-statistics in parentheses below the coefficient estimates. All standard errors are adjusted for clustering at the firm level. Definitions of variables are provided in Table 3. Statistical significance at the 1%, 5% and 10% level is indicated by ***, ** and *, respectively. N=928.

Table 6: Determinants of Director Performance-based Compensation

Dependent Variable Model	Performance-based Compensation (0,1)				
	1	2	3	4	5
<i>A – Firm Characteristics</i>					
Size	0.3517*** (7.34)	0.3514*** (7.11)	0.4343*** (5.37)	0.4667*** (5.85)	0.4613*** (5.52)
Capital Structure					
<i>Leverage</i>	-1.1765*** (-2.61)	-1.2174*** (-2.76)	-1.2448*** (-2.70)	-1.2237*** (-2.64)	-1.2950*** (-2.85)
<i>Free Cash Flow</i>	0.0004*** (4.59)	0.0004*** (4.45)	0.0005*** (4.57)	0.0005*** (4.59)	0.0005*** (4.60)
Investment Opportunities	0.0095 (0.43)	0.0109 (0.49)	0.0039 (0.18)	0.0077 (0.34)	0.0094 (0.41)
Risk	-0.8305 (-0.52)	-0.3430 (-0.22)	-1.0212 (-0.62)	-1.0135 (-0.61)	-0.8371 (-0.51)
Competition	-0.0050 (-0.54)	-0.0038 (-0.42)	-0.0079 (-0.85)	-0.0076 (-0.82)	-0.0080 (-0.86)
<i>B – Corporate Governance: Ownership Structure</i>					
Ownership Concentration	-0.3132 (-0.86)	–	-0.2685 (-0.74)	-0.2986 (-0.81)	–
Management Ownership	–	-0.7774** (-2.13)	–	–	-0.8438** (-2.11)
External Blockholder	–	-0.0530 (-0.18)	–	–	-0.0136 (-0.05)
Institutional	–	-1.7157*** (-3.79)	–	–	-1.9383*** (-4.22)
<i>C – Corporate Governance: Board Characteristics</i>					
Board Size	–	–	-0.0586** (-2.06)	-0.0607** (-2.13)	-0.0624** (-2.03)
Meetings	–	–	0.0085 (0.25)	0.0096 (0.28)	0.0059 (0.17)
Directorships (0,1)	–	–	0.4517** (2.48)	0.4757*** (2.58)	0.5460*** (2.84)
Chairman Independence	–	–	–	-0.04904 (-0.69)	0.0363 (0.48)
Professional Directors	–	–	–	-0.7626** (1.98)	-0.8125** (-2.03)
Industry Effects (Wald test)	Yes***	Yes***	Yes***	Yes***	Yes***
Year Dummies	Yes	Yes	Yes	Yes	Yes
McKelvey and Zavoina R ²	0.296	0.310	0.308	0.313	0.333
Adjusted Count R ²	0.124	0.167	0.136	0.136	0.209
Model Log Likelihood	168.33***	169.87***	173.05***	177.14***	171.04***

Table 6 reports estimates of population-averaged logit regressions relating to the probability of companies adopting a performance-based compensation scheme. In all models the dependent variable equals 1 if the firm provides directors compensation packages that include performance-based compensation elements and 0 otherwise. We include in all models a full set of industry dummies based on the Fama/French 12-industry portfolio and year dummies (Fama and French 1997). Robust Z-statistics are reported in the parentheses below the coefficients and have been corrected using the Huber/White sandwich estimator of variance. Three goodness-of-fit measures are reported: McKelvey and Zavoina's R², adjusted Count R² and log likelihood statistics. */**/** significance is at the 0.10/0.05/0.01 level respectively. Definitions of variables are provided in Table 3. N=928, with 335 companies without performance-based compensation and 593 companies having adopted this compensation component.

Figure 2: Conditional Effects Plot for Selected Predicted Probabilities



This figure provides conditional effects plots for selected corporate and governance characteristics. In all graphs, the y-axis denotes the predicted probability of adopting performance-based compensation and the x-axis the firm size, measured as a logarithm of total assets. In Figure (a), we present the base scenario in which the predicted probability is plotted against the firm size; the grey shading shows the 95% confidence interval. The other figures display predicted probabilities against firm size depending on (b) different levels of institutional ownership, (c) whether the board is busy and (d) depending on the share of professional directors sitting on the board. In Figure (b), the dashed-dot curve represents 0% institutional ownership and the dashed line 50%. A busy board is denoted by the dashed-dot line in Figure (c) and by a dashed line otherwise. In Figure (d), the dashed-dot line represents zero professional directors on the board and the dashed curve 50% professional directors. All other variables are held at their mean. The calculation of the presented predicted probabilities is based on Model 5 in Table 6. Definitions of variables are provided in Table 3.

Table 7: Fixed-Effects Estimates of Director Total Compensation Determinants

Dependent Variable Model	Natural Logarithm of Total Compensation per Director						
	A1	B1	B2	B3	C1	C2	D1
<i>A – Firm Characteristics</i>							
Size	0.2000*** (2.47)	0.1886** (2.34)	0.1796** (2.15)	0.1774** (2.15)	0.1704** (2.11)	0.1763** (2.21)	0.1964*** (2.67)
Capital Structure							
<i>Leverage</i>	-0.5568*** (-2.65)	-0.3630* (-1.75)	-0.3466* (-1.69)	-0.3421* (-1.65)	-0.3216 (-1.59)	-0.3311 (-1.62)	-0.3414* (1.76)
<i>Free Cash Flow</i>	3.06E-05** (2.03)	2.96E-05** (2.07)	2.88E-05** (2.02)	2.97E-05** (2.07)	2.93E-05** (2.06)	2.94E-05** (2.03)	3.29E-05** (3.10)
Investment Opportunities	-0.0024 (-0.85)	-0.0022 (-0.86)	-0.0036 (-1.20)	-0.0020 (-0.80)	-0.0021 (-0.85)	-0.0022 (-0.79)	-0.0017 (-0.64)
Risk	0.6005 (1.31)	0.6483 (1.45)	0.6820 (1.57)	0.6797 (1.56)	0.6764 (1.57)	0.7187* (1.66)	0.4864 (1.27)
Competition	-0.0001 (-0.05)	-0.0003 (-0.20)	-0.0005 (-0.32)	-0.0004 (-0.29)	-0.0005 (-0.32)	-0.0005 (-0.34)	0.0002 (0.14)
<i>B – Corporate Performance</i>							
Capital Market Performance							
<i>TSR</i>	–	-0.0004* (-1.66)	–	-0.0005 (-1.51)	-0.0004 (-1.41)	-0.0004 (-1.40)	-0.0004 (-1.36)
<i>Dividend Yield</i>	–	–	0.0087* (1.92)	0.0078* (1.81)	0.0080* (1.87)	0.0077* (1.83)	0.0078* (1.76)
Accounting/Operative Performance							
<i>ROA</i>	–	0.0080*** (3.51)	–	0.0078*** (3.38)	0.0080*** (3.53)	0.0078*** (3.41)	0.0082*** (3.79)
<i>ROIC</i>	–	–	0.0042*** (2.79)	–	–	–	–
<i>C – Corporate Governance: Ownership Structure</i>							
Ownership Concentration	–	–	–	–	-0.3152 (-1.41)	–	-0.3419 (-1.56)
Management Ownership	–	–	–	–	–	-0.3280* (-1.84)	–
External Blockholder	–	–	–	–	–	-0.1771* (1.71)	–
Institutional	–	–	–	–	–	-0.0247 (-0.17)	–
<i>D – Corporate Governance: Board Characteristics</i>							
Board Size	–	–	–	–	–	–	-0.0846*** (-3.97)
Meetings	–	–	–	–	–	–	0.0125 (1.51)
Directorships (0,1)	–	–	–	–	–	–	-0.0296 (-1.12)
Chairman Independence	–	–	–	–	–	–	0.0886* (1.79)
Professional Directors	–	–	–	–	–	–	0.2255** (2.55)
FE Cross-Section (F-test)	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ² (Within)	0.130	0.153	0.150	0.154	0.159	0.159	0.221
Model F-Test	8.39***	9.57***	9.00***	9.29***	8.89***	7.87***	8.61***
Robust Hausman Chi ²	10.319	11.885	8.622	12.425	12.474	15.296	43.371
P-value	0.3253	0.3724	0.6567	0.4122	0.4892	0.4303	0.001

This table presents fixed-effects estimates of the determinants of director total compensation. Besides firm-fixed effects, all models include year dummies. We present t-statistics in parentheses below the coefficient estimates. All standard errors are adjusted for clustering at the corporate level. Definitions of variables are provided in Table 3. Statistical significance at the 1%, 5% and 10% level is indicated by ***, ** and *, respectively. N=928.

Table 8: Robustness Test of Director Performance-based Compensation Determinants

Dependent Variable Model	Performance-based Compensation (0,1)				
	1	2	3	4	5
<i>A – Firm Characteristics</i>					
Size	0.3692*** (6.91)	0.3647*** (6.68)	0.4737*** (5.25)	0.5006*** (5.64)	0.4901*** (5.31)
Capital Structure					
<i>Leverage</i>	-1.1591** (-2.29)	-1.2037** (-2.42)	-1.1879** (-2.33)	-1.1494** (-2.24)	-1.1984** (-2.38)
<i>Free Cash Flow</i>	0.0004*** (4.69)	0.0004*** (4.60)	0.0004*** (4.74)	0.0004*** (4.77)	0.0004*** (4.76)
Investment Opportunities	0.0076 (0.34)	0.0091 (0.41)	0.0028 (0.13)	0.0050 (0.21)	0.0083 (0.36)
Risk	0.3023 (0.17)	0.4647 (0.27)	0.1349 (0.08)	-0.0411 (-0.02)	0.0869 (0.05)
Competition	-0.0016 (-0.17)	-0.0022 (-0.24)	-0.0033 (-0.36)	-0.0035 (-0.37)	-0.0048 (-0.51)
<i>B – Corporate Governance: Ownership Structure</i>					
Ownership Concentration	-0.0430 (-0.10)	–	-0.0530 (-0.13)	-0.0362 (-0.09)	–
Management Ownership	–	-0.3815 (-0.88)	–	–	-0.3983 (-0.87)
External Blockholder	–	0.1081 (0.32)	–	–	0.1758 (0.52)
Institutional	–	-1.8321*** (-3.77)	–	–	-2.0203*** (-4.04)
<i>C – Corporate Governance: Board Characteristics</i>					
Board Size	–	–	-0.0730** (-2.01)	-0.0762** (-2.13)	-0.0714* (-1.88)
Meetings	–	–	0.0082 (0.23)	0.0067 (0.19)	0.0035 (0.10)
Directorships (0,1)	–	–	0.3771* (1.92)	0.3906** (1.97)	0.4686** (2.26)
Chairman Independence	–	–	–	-0.0365 (-0.46)	0.0351 (0.41)
Professional Directors	–	–	–	-0.6829 (-1.62)	-0.7745* (-1.79)
Industry Effects (Wald test)	Yes***	Yes***	Yes***	Yes***	Yes***
Year Dummies	Yes	Yes	Yes	Yes	Yes
McKelvey and Zavoina R ²	0.367	0.381	0.374	0.377	0.395
Adjusted Count R ²	0.138	0.190	0.181	0.138	0.218
Model Log Likelihood	152.77***	161.05***	159.20***	160.81***	165.61***

Table 8 reports estimates of population-averaged logit regressions relating to the probability of companies adopting a performance-based compensation scheme. In all models the dependent variable equals 1 if the firm provides director compensation packages that include performance-based compensation elements and 0 otherwise. We include in all models a full set of industry-dummies based on the Fama/French 48-industry portfolio and year dummies (Fama and French 1997). Robust Z-statistics are reported in the parentheses below the coefficients and have been corrected using the Huber/White sandwich estimator of variance. Three goodness-of-fit measures are reported: McKelvey and Zavoina's R², adjusted Count R² and log likelihood statistics. */**/** significance is at the 0.10/0.05/0.01 level respectively. Definitions of variables are provided in Table 3. N=827, with 313 companies without performance-based compensation and 514 companies having adopted this compensation component.